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Diets and Gastrointestinal Function
Joint A.D.A.-A.M.A. Committee

Meal-Eating, Nibbling, and Body Metabolism
Clarence Cohn

Magnesium in Accessory Foods
Gweneth Y. Nelson and Mary R. Gram

Foods People Accept or Reject
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Diet as Related to Gastrointestinal Function

Report of the Joint Committee on Diet as Related to Gastrointestinal Function of The American Dietetic Association and the American Medical Association[1]

FOODS ARE often blamed when persons, otherwise healthy, complain of heartburn, eructation, low thoracic or abdominal burning, "hyperacidity," abdominal fullness, bloating, pressure, aching, pain, "gas," borborygmi, excessive "activity," flatulence, constipation, and diarrhea. When gastrointestinal disorders underlie such symptoms, their degree is believed to be enhanced by some foods and diminished by others. To evaluate the validity of such correlations between food and gastrointestinal symptomatology, the Joint Committee of the Council on Foods and Nutrition of the American Medical Association and The American Dietetic Association has surveyed current dietary practices and has critically examined the rationale and much of the evidence underlying such practices. The interpretations and evaluations presented here must, however, be recognized for what they are: namely, a synthesis of tentative opinions held by Committee members on the basis of their knowledge of the literature, their experience, and their discussions. Knowledge in the field is far too meager to permit authoritative or final conclusions.

This report does not apply to dietotherapy of infants and young children, or to idiopathic steatorrhea (sprue or celiac disease), probably the only condition of the digestive tract in which a clear-cut specific food intolerance has been established. In addition, it concerns itself only with the gastrointestinal effects attributed to specific foods. Emphasis is not placed on the nutritive value of food; the total daily amount taken; the relative amounts of carbohydrates, protein, and fat ingested; the temperature of food; or the influence of frequency and regularity of eating and drinking.

Current Practice

As described in eighteen diet manuals prepared in eighteen different states, diets used for the therapy of gastrointestinal symptoms appear to be known (a) by their consistency, flavor, or composition, such as bland; (b) by the gastrointestinal disease for which each is presumably intended; or (c) by the name of the physician who sponsored the specific dietary regimen, such as Sippy or Meulengracht. Some manuals contain recommended diets have been streamlined so one diet may meet a group of therapeutic objectives. In others, a number of diets are listed for the treatment of gastrointestinal disorders, and some manuals list as many as eight different diets that are actually quite similar when analyzed with respect to the foods allowed or restricted.

In general, foods that tend to be restricted in most diets advocated for gastrointestinal conditions are: strongly flavored cheeses, pork, ham, spiced meats, legumes, turnips, cabbage, raw fruits, hot breads, coffee, tea, alcoholic beverages, spices, and relishes. However, there are some interesting regional differences. For example, under the "bland diet," shrimp and game meats are allowed in the Texas Diet Manual; and bean sprouts, zucchini, eggplant, and mushrooms are included in the Hawaiian Diet Manual. Avocado and strained corn are included in diets in areas where these foods are common and are excluded or not mentioned in other diet manuals.

[1]Members of the Committee are: Franz J. Ingelfinger, M.D., Professor of Medicine, Boston University School of Medicine, Chairman; Robert Olson, M.D., Ph.D., Professor and Head, Department of Biochemistry and Nutrition, Graduate School of Public Health, University of Pittsburgh; Theodore B. Van Itallie, M.D., Director of Medicine, St. Luke's Hospital, New York, New York; Louis Weinstein, M.D., Professor of Medicine, Tufts University School of Medicine, Boston; Elizabeth Caso, Nutritionist, Cambridge (Mass.) Health Department, and Instructor in Nutrition, Department of Public Health Practice, Harvard School of Public Health, Boston; and Doris Johnson, Ph.D., Director of Dietetics, Grace-New Haven Community Hospital, and Assistant Professor, Department of Public Health, Yale University School of Medicine, New Haven, Connecticut.

Extent of Knowledge

In evaluating what is known concerning the effect of foods on gastrointestinal structure and function, a sharp distinction must be drawn and kept in mind between: (a) the chemical and physical composition of a food before its ingestion, (b) the effect of that food in altering the gastrointestinal contents, (c) the effect of the food or its products on the digestive tube itself, and (d) the clinical significance of such an effect, i.e., the harm or symptoms produced. For example, food with a high roughage content is often regarded as being "rough on" the gut while bland food is believed to soothe it like a salve. Such naive correlations between the nature of a food and its gastrointestinal effects are in most instances entirely unwarranted.

Considerable information concerning the chemical and physical characteristics of foods before ingestion is available because analysis of such material presents few difficulties. To determine the effect of a food on the gastrointestinal contents, however, it is necessary to know not only what happens to the food in the gut, but also how it changes gastrointestinal chyme and flora. Data of this type are only spottily available. Finally, if a food is to produce or allay gastrointestinal symptoms, it presumably must do so by changing the structure, secretions, vascularity, or, above all, the motility of the digestive tube and its ancillary organs. A number of studies have been carried out concerning the effect of foods on gastric secretion, but otherwise nearly total ignorance on these points prevails.

STOMACH

Acidity of Gastric Contents. Foods must be evaluated on the basis of both their immediate direct and delayed indirect effect on the gastric contents. The *p*H of food ranges from about 2 (lime juice) to 8 (egg white and Graham crackers), but most foods have a *p*H of between 5 and 7 (1). The *p*H of orange and grapefruit juices is about 3.2 to 3.6, considerably less acid than the normal gastric secretion, and the practice of diluting fruit juices with water affects *p*H negligibly from a clinical viewpoint. Thus, on the basis of their immediate acidity, acid fruit juices should theoretically be harmful only to oral, esophageal, and perhaps to gastric lesions, especially if the stomach is achlorhydric. Otherwise the *p*H of a food before its ingestion has little dietotherapeutic significance.

The immediate direct effect of proteins is to buffer gastric acidity. Milk, the most popular buffer of this type may very briefly elevate the *p*H but the buffering effect is insufficient to achieve the level of 3.5, usually defined as desirable for peptic ulcer healing for any prolonged period of time (2).

With respect to the delayed, indirect effect of foods on gastric acidity, it must be recognized that almost anything put into the stomach, including water, tends to stimulate gastric secretion. Some substances, however, stimulate more than others. Proteins, particularly fish and meat, are among the most potent dietary stimulants of gastric secretion, whereas carbohydrates and fats have a lesser effect. The secretory response evoked by fruit juices is controversial (3), but in some studies it has been found to be slight (4). Therefore, some inverse correlation exists between the immediate and delayed effect of many food items.

Statements concerning the influence of foods on gastric secretion must be qualified, however, because by and large the effect of pure food substances has been studied. Only a few observations exist to indicate how a specific food, when added to or removed from an ordinary meal, affects gastric secretion. In man, citrus fruit juices had little effect when added to a full breakfast (5), but 1 ml. olive oil per kilogram body weight given to dogs reduced the volume and acidity of the secretion following ordinary meals by 20 to 35 per cent (6).

Fats have been advocated to "inhibit" gastric secretion. This inhibitory effect is relative, however, and is more effective in counteracting psychic than chemical gastric secretory stimuli; and fats, especially if sizable amounts are ingested, may themselves be followed by a late period of augmented acid output (6). Furthermore, no experimental observations exist to indicate that dairy fats, traditionally recommended to the ulcer patient, are more effective in depressing the gastric secretory response than are animal fats or fried foods, traditionally interdicted with vigor.

Spices do not clearly affect gastric acid secretion in any major or consistent way (7), but caffeine and alcohol, at least when consumed by themselves, may be accepted as enhancing acid output by the stomach.

Other Gastric Aspects. Other aspects of gastric structure and function that foods might affect are the secretions of pepsin and mucus, vascularity, motility, and rate of tissue healing. Pepsin secretion, in response to the intake of different foods, tends to parallel that of acid. Concerning the production of mucus in response to dietary items, practically nothing is known, although the application of pharmacologic rather than culinary doses of mustard extracts to gastric mucosa does stimulate formation of mucoid material. In general, gastric mucosal vascularity is increased concomitantly with enhanced secretory or motor activity. Specific and localized hyperemia due to "irritation" by a food has not been documented with the exception of black pepper (7). Most spices are apparently quite innocuous in this regard.

"Digestibility." Gastric evacuation as affected by foods is retarded by two mechanisms: the ingestion of fats which, in turn, depresses gastric motility, and the swallowing, or formation in the stomach, of large chunks that do not readily pass the pylorus. It is in this field of gastric evacuation that perhaps the greatest confusion exists concerning alleged deleterious or beneficial effects of food on the digestive system, chiefly because "digestibility" has for years been measured in terms of rate of gastric evacuation. Hence the current concept is that fat or a large curd is "indigestible." In a literal sense, this correlation between rate of gastric emptying and digestibility is, of course, totally erroneous. Raw egg white, which is hardly detained in the stomach at all, also rushes through the small bowel with minimal digestion (8); conversely, dogs seem to digest large chunks of meat, which presumably stay in the stomach for some time, better than ground preparations of the same substance (9). Even if "digestibility" is used in its vernacular sense of "belly comfort," indigestibility and retention of food in the stomach are not necessarily subject to correlation.

Much has been made, for example, of the soft, easily fragmented curd produced when homogenized milk is taken, as opposed to the tough big curd which forms when ordinary milk is consumed. Formation of a tough curd with prolonged exposure to gastric digestive processes may, however, prevent some of the bowel disturbances which might ensue should milk be introduced too rapidly into the small intestine. Milk given rapidly via an enterostomy is certainly not well tolerated.

Ulcerations produced in the stomach of rabbits by surgical trauma healed more rapidly when the rabbits thereafter ate puréed carrots rather than their "usual rough diet" (2). On the other hand, controlled studies in man show that the so-called blandness of the diet does not affect the rate of duodenal ulcer healing (10).

Excepting the considerable body of knowledge that exists concerning the effect of foods on gastric acid production, information about the influence of foods on other functions and structure of the stomach is obviously fragmentary and insufficient either to support or contravene most of the dietary injunctions imposed on the patient with upper digestive tract complaints. It seems adequately established that a food must be extraordinarily irritating and taken in fairly large amounts before objective changes in the gastric mucosa can be demonstrated.

The varying ability of foods to stimulate secretion of gastric hydrochloric acid seems to be an entirely innocuous phenomenon in normal subjects. In those with inflammatory or ulcerative disease of the upper digestive tract, a case can be made for the use of proteins that have an immediate buffering (but a late acid-stimulating) effect, and of moderate amounts of fat to lessen the secretory and motor responses to meals. It remains to be demonstrated, however, whether a diet can be formulated that reduces the daily total gastric acid output; and for hour-to-hour control of gastric acidity, frequency and regularity of dietotherapy are probably more important than type of food ingested.

INTESTINES

The process of digestion is normally quite efficient, and the major foodstuffs that compose the bulk of the food supply, i.e. fat, protein, carbohydrates, and minerals, are well digested and absorbed. The residue which is discharged from the gastrointestinal tract in the form of stool is primarily indigestible material, microorganisms and their products, and secretions and cells shed from the alimentary tract.

Indigestible material consists of three families of compounds, namely cellulose, hemicellulose, and, lignin. Cellulose is the linear beta D-glucoside of glucose. The hemicelluloses include everything of a carbohydrate nature except cellulose, starch, and soluble sugars. Some are true carbohydrates, such as pentosans, hexosans, galactosans, and some are uronic acids. The lignins are non-carbohydrate portions of woody tissue easily oxidized by nitric acid and are composed of substituted phenylpropane units. Other names at times applied to indigestible material are "unavailable carbohydrate," "fiber content," "bulk," and "roughage."

The indigestible residue content of various foods before they are eaten cannot be stated with confidence. This is partly because the residue of an item, such as a vegetable, varies with locality and season of its growth, its age when picked, and its method of preparation; and partly because methods of defining and analyzing for residue vary greatly. According to the most extensive study of food residues ever published (11), unavailable carbohydrate in orange juice is, for example, zero; in cantaloupe, 1 per cent; in boiled spring cabbage, 2.2 per cent; in boiled fresh peas, 5.2 per cent; in Shredded Wheat, 6 per cent; and in fresh passion fruit, 16 per cent. Figures such as those given for cabbage led McCance to state (11): "Even the green leaves, which are confidently advised as a certain cure for constipation by physicians writing in the popular press, contain only 1.6 to 4.5 per cent [roughage]." On the other hand, Williams and Olmsted found by a different method that the indigestible residue in uncooked cabbage was approximately 50 per cent (12). The total indigestible residue of fourteen different foods contained 24 to 75 per cent cellulose, 18 to 60 per cent hemicellulose, and 7 to 60 per cent lignin, this substance being particularly high in banana (13).

TABLE 1 **Summary of data from studies of residues from food**

TYPE OF DIET	AMOUNT OF TEST FOOD	FECES		REFERENCE
		Wet weight	Dry weight	
	gm./24 hr.	*gm./24 hr.*	*gm./24 hr.*	
Mixed	—	100–150	20–30	Schmidt and Strasburger (14)
Meat	1435	64.0	17.2	Schmidt and Strasburger (14)
White bread	1237	109.0	28.9	Schmidt and Strasburger (14)
Dark bread	1360	815.0	115.8	Schmidt and Strasburger (14)
Potato	3078	635.0	93.8	Schmidt and Strasburger (14)
Peas	960	927.1	124.0	Schmidt and Strasburger (14)
Milk	3075	174.0	40.6	Schmidt and Strasburger (14)
Milk	3 qt.	114.5	25.3	Parsons (15)
Milk	1680	—	21.5	Rabinowitch and Fowler (16)
Cabbage (uncooked)	210	700 (approx.)	—	Williams and Olmsted (12)

These changes in food composition are reflected at least in part in the stool. As shown in Table 1, a diet containing a large amount of indigestible residue increases both the wet and dry weight of the feces (14-16). Supplements of such foods as apples (36 oz.); oranges (36 oz.); celery, cabbage, tomatoes, and lettuce (21 oz. each); and 3 to 6 oz. wheat bran increase the wet weight of the stool by roughly 500 gm. per day.

Effect of Particle Size. The size of swallowed particles affects food residues but moderately. In extensive studies, Seppä found (18) that the dry fecal residues after eating principally potatoes, rye zwieback, wheat zwieback, beef, beans, or bananas were unaffected by thorough, average, or poor chewing. Only cold smoked fat appeared to be better absorbed after careful chewing. On the other hand, unchewed chunks or samples of various meats, potatoes, peas and carrots, if served in mesh bags, passed through the digestive tract from 16 per cent (new boiled potatoes) to 83 per cent (garden peas) undigested, whereas various samples of cooked fats, hard boiled egg, rice, bread, and cod, similarly prepared and swallowed, were completely digested (19). Practical experience indicates that completely unchewed materials, particularly vegetable matter, may appear in the stools and that the degree of this phenomenon is enhanced in diarrheal states.

Intestinal Flora. Although the human gastrointestinal tract secretes no enzymes that can break down cellulose, hemicellulose, and lignin, various bacterial enzymes are capable of this digestion, and intestinal bacteria to a variable extent thus alter and decrease indigestible residues. The type of food presented to the lower gut in turn influences the character of the local bacterial flora.

At birth, the gastrointestinal tract is essentially sterile, but implantation of microorganisms occurs rapidly. In the breast-fed infant, *L. bifidus* predominates. When the diet contains cow's milk, *L. acidophilus* is found, and this organism persists as the major component of the flora until a more solid diet is begun. *E. coli* then gradually becomes predominant. Other members of the coli-aerogenes group, micrococci, anaerobes, Proteus organisms *B. subtilis*, yeasts, and molds comprise the variable secondary flora. If special media and careful anaerobic techniques are used, the primary intestinal flora appears to be anaerobic, with bacteroides group predominating (20). Lactobacilli also occur in the stools of most persons on an ordinary diet (21).

The feeding of lactose, fruits, and carbohydrates in general leads to an increase in gram-positive organisms, such as lactobacilli, enterococci, and streptococci, the *p*H of the feces approaching 5. Acidophilus-milk feeding, especially when supplemented with lactose, may lead to a simplified flora consisting largely of *L. acidophilus*. A high-protein intake, conversely, promotes the growth of a gram-negative, so-called "putrefactive" flora, including coliform and Proteus organisms and anaerobes. Fecal *p*H is then nearly neutral (22). Although dietary manipulation does alter the fecal flora, the response varies markedly in degree from time to time and from person to person. Thus, the bowel flora initially present may influence the results obtained, and some individuals, especially those in the older age groups, appear to be quite resistant to the establishment of any new intestinal flora.

Diet and Stool Volume. It is generally assumed that indigestible residue in the bowel adsorbs water, and that the moist mass of bulk stimulates intestinal motility, thus further lessening water absorption by the colon. Few studies are available, however, to document these concepts. The most exhaustive studies on the mechanism of more copious stool production by a high-residue diet were carried out by Olmsted and his associates (12). From a review of the literature, they concluded that the range of titratable acidity of feces was 1 to 67 mEq per 100 gm. fresh, wet material; that this acidity was to a large extent caused by volatile fatty acids (acetic, butyric); and that the greatest elimination of fatty acids and largest stool volume occurred on a high-

carbohydrate diet. Their own studies revealed a parallelism between the hemicellulose (but not cellulose or lignin) content of the diet, the amount of volatile fatty acids in the feces, and the weight of the stool. Olmsted *et al.* thus concluded that bulk led to increased fecal elimination by the bacterial degradation of hemicelluloses to volatile fatty acids which, in turn, were assumed to irritate the bowel. That these acids do stimulate bowel motility, either pharmacologically or by distention, has not been clearly documented.

Bacteria also digest and ferment carbohydrates that are susceptible to human enzymatic digestion but which may reach the colon because the amount of carbohydrate ingested is excessive in relation to the digestive capacity of the gut. Thus, if a pure wheat starch diet is taken, a sour, loose, and gassy stool may ensue, presumably because an acidophilic bacterial flora thrives on any unabsorbed carbohydrate residue, digestible or not, to form H_2, carbon dioxide, and volatile fatty acids. Diarrhea with increased amounts of fecal volatile fatty acids and lactic acid may also be associated with a normal carbohydrate intake when the activity of intestinal sugar-splitting enzymes is deficient (23).

"Gas-Producing Foods." Probably one of the most established of all popular convictions is that certain foods are "gas producers." Investigations on this matter have, nevertheless, been singularly unsuccessful in substantiating these beliefs. In one study, rectal gas was less when the subject was placed on a high-vegetable diet (24). In another, cabbage, which appears to enjoy an even greater reputation as a gas former than baked beans, produced no more rectal flatus by actual measurement than did many other foods; only the combination of a high-fat intake and vegetables seemed to enhance gas output to some extent (25). In the third study (26), a diet of soybeans and fat increased the volume of rectal flatus from 0.6 to 2.9 liters per day in one subject, but the results were inconsistent, and the authors commented: "Although not markedly reflected in the daily egestion of gas, the soy bean diet caused subjectively at least a great deal more flatulence."

As this comment suggests, measurement of rectal gas expelled does not necessarily correspond to intestinal gas formation, since unknown amounts of gas may be absorbed. In addition, accurate collection of rectal gas is technically difficult. Finally, if the quality and quantity of rectal gas appear changed the responsible mechanism may not merely be fermentative, but the food may have influenced the amount of air swallowed, or of gases diffusing between blood and bowel, two factors generally believed of major importance in accounting for intestinal gas. Because of our gross lack of knowledge, and because so many factors may influence intestinal gas, classification of foods according to their gas-forming properties has very little basis.

Residues from Milk. It may be argued that fecal material, representing the end results of diet, gastrointestinal functions, and bacterial activity, is less important from the viewpoint of colonic dietotherapy than the nature of ileal effluent. Partly for this reason, Hosoi, Alvarez, and Mann (9) performed their well known studies in dogs with lower ileum attached to the rectum and concluded that gelatin, hard boiled eggs, and meats had low residues; whereas raw egg whites, bananas, potatoes, milk, lard, butter, apples, and prunes were high-residue foods. The applicability of these results to human dietetics is, however, not quite clear. Pure food substances were given once daily, sometimes in large quantities, e.g., 10 gm. butter per kilogram, and force-feeding had to be employed. Results under such conditions are not necessarily the same as when ordinary amounts of a food are added to a mixed natural diet which is consumed with a certain amount of pleasure. In addition, human and canine digestive and absorptive functions are probably no more identical than the usual dietary habits of these respective species. For these reasons, the generalization that milk is a high-residue food should be accepted with some reservation.

In human subjects with ileostomies, 600 cc. milk per day, taken in place of 600 cc. water and added to an otherwise palatable and balanced diet, does not increase the volume of the ileal effluent (27), a finding consistent with earlier observations (28, 29). In spite of statements to the contrary (9), milk also does not emerge as a high-residue food on the basis of fecal studies reported in the literature (14-16) (Table 1). Milk, it may be concluded, should be classified as a medium-residue, not as a high-residue food for adult man.

Most foods tend to exhibit the same quantitative residue characteristics, whether fecal or ileal discharges are studied; qualitatively, especially with respect to acidity and fermentative products, fecal material will be altered from that present in the ileum, depending on the degree and type of bacterial activity. In general, foods may be listed in order of increasing residue production, as follows: proteins, fats, milk, digestible carbohydrates, and carbohydrates with indigestible material.

Some foods, such as certain fruits and their juices, appear to stimulate intestinal motility by pharmacologic means. The laxative principle said to be active in prune juice, for instance, has been identified as di-hydroxyphenyl isatin (30). In general, however, data on pharmacologically laxative principles in foods are very sparse; it is not known what foods do or can have such properties, on what part of the intestines they act, how they work, or

what proportion of the population is susceptible to their action. Prune juice, however, appears to have some effect on the small bowel, for 200 ml. per day added to an otherwise normal diet, increased the 24-hr. wet weight of ileal discharges by about 250 gm. in each of five subjects (27).

Clinical Applications

Rational dietotherapy of gastrointestinal disorders should depend on (a) reasonably well accepted knowledge of how a dietary regimen changes gastrointestinal contents and function and (b) how such changes, in turn, affect the mechanisms underlying the disorder. If dietary recommendations related to the use of specific food items are evaluated on the basis of such criteria, the following practices appear to qualify as rational:

(a) In inflammatory or ulcerative conditions of the esophagus and stomach, elimination of foods with a *p*H of 4 or less.

(b) In "peptic" disorders related to gastric acidity, the use of proteins for their immediate buffering effect, and of moderate amount of fats to counteract the late stimulating effect of proteins on gastric secretion.

(c) In functional or other disorders possibly related to a deranged gastric evacuation mechanism, a reduction of fatty foods, since these in themselves retard gastric evacuation.

(d) In any gastrointestinal condition associated with stenosis of the lumen, elimination of chunky material and foods having or producing a high residue.

(e) In conditions associated with neurogenic intestinal stasis ("paralytic ileus"), such as postoperative states, moderate reduction of residue-containing foods.

(f) Dietary manipulations required by specific diseases: elimination of gluten in nontropical sprue; reduction of sugars, starches, and others with actual or potential osmotic activity in patients with postgastrectomy dumping; restriction of carbohydrates in an attempt to alter intestinal flora in "fermentative diarrhea," if good evidence is available that such a condition is present.

Otherwise, all the elaborate food lists used today for treating gastrointestinal disorders must be regarded as based on unverified impressions and traditional lore. Such bases, like much folklore, must contain veins of truth, but to find them in a mountain of rubble is a task for tomorrow. Many regulations as to what to eat and what not to eat suffer from three serious deficiencies:

(a) The harmful or beneficial qualities attributed to a food, such as labelling it "bland," "irritating," "gassy," or "indigestible," are conceptually vague and unproved by test. The common responsible local mechanism for gastrointestinal distress — be it the ache of spasm, the intermittent crescendoes of pain that mark hyperperistalsis, or the bloat and pressure of "indigestion" — depends on changes of tension within the walls of the gut. Thus, if a food were indeed "irritating," or by some other means caused gastrointestinal distress, it should do so by deranging gastrointestinal motor function. No studies exist to show that any specific foods in themselves either bring about or allay such motility derangements.

(b) The specific objectives of therapy, in terms of counteracting the mechanism of gastrointestinal disorders, are insufficiently appreciated to permit rational use of such food effects as are known. Some foods, for example, are known to have low, others high residues, but are these qualities "good" or "bad"? What is the benefit to a normal person of a bigger and more watery stool, possibly passed twice rather than once a day? What is the benefit of changing or depressing the intestinal flora? Few would argue that the diarrhea which may attend suppression of this flora by antibiotics constitutes "improved" bowel function, and animals raised in the germ-free state enjoy the "benefit" of considerable enlargement of the cecum (31).

In a constipated person, will high residue increase the ease of bowel movements? Constipation is usually ascribable to some sort of colonic motor disorder, and merely giving the colon more feces to work on does not necessarily relieve symptoms. Furthermore, as is believed to be true of the spastic colon, a greater amount of residue, or a greater production of volatile fatty acids, may merely enhance the already excessive nonpropulsive motility — the spasm — that characterizes the disorder, without helping to re-establish the normally integrated function that would give the patient relief. Conversely, in the patient with diarrhea, does a high residue really have deleterious effects? Certainly, plain indigestible (literally meant) material, such as kaolin or barium sulphate, sometimes appears to help diarrhea; hemicelluloses are said to adsorb fluids and might be used with as much rationale as synthetic methylcelluloses and other hydrophilic colloids; and since the etiology of most chronic diarrhea states is unknown, promotion of a normal bowel flora by offering it a normal distribution of food substances might be more beneficial than eliminating residues as much as possible. The contrary argument, that low-residue foods "rest" the diseased bowel, is a simple assumption which *may* be valid, but for or against which no evidence exists.

(c) Statistically valid evidence is obtained by investigations that adhere to objectivity, include controls, eliminate prejudice and psychic influence, and make due allowance for chance variations. As judged by such criteria, few studies are available

to show whether foods do what they are commonly believed to do. The few valid studies that exist fail to substantiate various popular beliefs concerning the irritating effects of some ingested materials on the gastrointestinal tract. Everybody "knows," for example, that iron preparations cause bowel complaints, but when subjects took placebo tablets believed to contain iron, the incidence of abdominal discomfort and bowel irregularities was the same as when the actual iron-containing tablets were taken (32). A careful, long-term study (15) did not confirm the many claims made for the laxative effect of bran. In a study currently under way, Koch and Donaldson (33) find that, on the average, the same foods are incriminated by all patients with digestive complaints, whether caused by functional disorders, peptic ulcer, hepato-biliary disease, or ulcerative and inflammatory disease of the small and large intestines. The limited evidence available suggests that the incrimination of certain foods as causing or enhancing abdominal symptoms, on the basis of the patient's say-so or the physician's pre-established concepts, cannot be accepted.

It may be pointed out that any food — even the blandest (if this can be defined) — apparently may cause distress if given in an unnatural manner. Hypertonic solutions in the small bowel cause forceful and crampy peristalsis. Enterostomy feedings, even if creamily smooth, lead to diarrhea. In addition, symptoms may ensue when single food items are eaten to excess. Thus raw egg white causes mucoid diarrhea in man and dog when taken in large amounts (8), and Rubner's subject became gassy and distressed after subsisting for three days on white bread as his sole source of solid nourishment (34).

Since a large proportion of dietary practices applied in the treatment of gastrointestinal disorders appears unsubstantiated or even irrational, should all dietary recommendations for the patient with digestive complaints be scrapped, except for the six purposes listed above? In view of the limited amount of real information available, such a radical recommendation is not warranted. On the other hand, the sparse and at times negative nature of the available evidence suggests that much popular gastrointestinal dietotherapy should be recognized as traditional, that apparent "success' of a dietary maneuver may be the result of a chance variation or a placebo effect, that adherence to the dicta of dietotherapy should not be insisted on too vigorously, and that such dietotherapy should be readily abandoned if indications exist that it may be psychologically or physically harmful.

This report cannot conclude without an emphatic restatement of the basic difficulty with dietotherapy as related to gastrointestinal structure and function: ignorance — ignorance as to what happens to an individual food item in the gut, as to its effect on the alimentary tube, and as to the real explanation of symptoms that might follow its ingestion. Such sparse information as is available is not collected in any organized and integrated form. It is unlikely that gastrointestinal dietotherapy will change or improve greatly until a broad investigative attack, probably tedious but nonetheless essential, is undertaken to learn exactly what foods do within the human digestive system.

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Hot Dogs

Americans consume upwards of 8 million hot dogs annually, making them the largest selling, most popular and well known stuffed meat product on the market today. Experts in the meat industry, however, point out that technically, twenty other varieties of stuffed meat are also included in the sausage family.

The large success of this industry today is due in large measure to the development in 1926, of the first satisfactory man-made sausage casing from regenerated cellulose, glycerine, and water. Until that time, animal intestines were used, but they posed problems of cleaning, varying diameter, thickness, length, and so on. With the introduction of the man-made product that did not have these shortcomings, the sausage industry made a major technologic advance.

Uniformity and cost advantages, coupled with the controlled stretch properties of artificial casings now make it possible to produce quality sausage at high speeds to meet today's exacting marketing demands.

Today meat casings are made in as many as 1100 varieties. The regenerated cellulose is plasticized with glycerine, then continuously extruded in a seamless tubular form. The final operation in its manufacture is a drying process in which the casing is bi-axially oriented to give strength and "elastic memory."

Glycerine gives the casing flexibility and its humectant properties prevent it from becoming stiff and brittle before use. It is unaffected by the high cooking temperatures as well as by sub-zero freezing temperatures.

This relatively simple material consisting of just three ingredients—cellulose, glycerine, and water—in actual performance does an outstanding job. The stuffing operation places tremendous physical demand on the material in terms of tensile, bursting, and tear strength. For packing purposes, it must also resist grease, oil, and other substances.—*From Glycerine Facts, Winter 1960.*

Meal-Eating, Nibbling, and Body Metabolism[1]

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THE RATE OF food ingestion, probably by its influence on specific enzymatic reactions, appears to play an important role in the regulation of over-all body metabolism (1, 2). This hypothesis is based on evidence suggesting that the consumption of full, spaced meals ("meal eating"), as contrasted with small, frequent feedings ("nibbling"), results in differences in the quantities of metabolites channeled over alternate and formerly rate-limiting enzymatic pathways.

Eating patterns seem to have been neglected as a factor regulating intermediary metabolism. In studies concerned with clarifying the interrelationships of the body's handling of carbohydrate, fat, and protein, it has been the custom to attempt to achieve a so-called "steady-state." In an effort to attain this condition, both the quantity and composition of the ingested food have been well controlled but, with few exceptions, the periodicity of food intake has been neglected. It appears to have been assumed that animals would handle ingested food in a similar fashion, regardless of whether the calories were consumed as nibbles or as meals. However, recent findings indicate that different eating habits are accompanied by differences in the manner in which the body handles its daily load of calories.

Effects of Eating Habits on Animals

It was originally observed that rats fed twice daily by stomach tube (force-fed, meal eaters) contained almost double the amount of body fat as animals eating the same diet *ad libitum* (nibblers) (3) (Table 1). This finding was obtained under the conditions of either "pair-gaining" or "pair-feeding" the force-fed animals against those with free access to food (4, 5). The alterations in body lipid were not dependent on handling, sex, the presence or absence of the adrenals, the dilatation of the stomach that accompanies forced feeding, the type of dietary protein, or the administration of food during the day or night (6). Attendant on the increased body fat in the meal-eating rats was a decrease in their body content of protein and water (5, 7). Further studies have revealed (a) evidence for diminished thyroid activity (8, 9) secondary to decreased formation and/or release of the pituitary's thyroid stimulating hormone and (b) differences in intracellular enzymatic activity when the two groups of animals were compared (10, 11).

The results of these studies have led to the belief that manipulation of the conditions of food intake provides a simple method for exploring possible effects of eating habits on both intermediary metabolic reactions as well as on experimental "metabolic" diseases. Thus, data are available which can be interpreted to indicate that meal-eating in the experimental animal is associated with: (a) obesity (4, 7, 11); (b) the development of manifest diabetes mellitus in partially depancreatized rats (12); (c) an increase in the severity of existing alloxan diabetes (13); (d) a greater elevation of serum cholesterol levels with a diet containing modest amounts of cholesterol, a slower rate of fall to normal of elevated serum cholesterol levels with a cholesterol-free diet, and an enhancement in the production of and an inhibition in the regression of atherosclerosis (14, 15); and (e) the development of hepatic cirrhosis with a high-fat diet, despite normal intake of vitamins and protein (16).

Effects of Eating Habits on Man

Studies of man, with respect to his reactions to eating habits, have yet to be systematically undertaken. At birth, man is normally fed "on demand"

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TABLE 1 **Changes in body fat of rats fed *ad libitum* or force fed for two weeks***

FEEDING REGIMEN	BODY COMPOSITION							
	Original†			Final			Changes	
	Body weight	Fat		Body weight	Fat		Body weight	Fat
		Total	Per cent body weight		Total	Per cent body weight		
	gm.	*gm./rat*		*gm.*	*gm./rat*		*gm.*	*gm./rat*
Ad libitum	148	20.1	13.5	212	20.4	9.6	64	0.3
Force fed	159	15.3	9.6	222	39.0	17.6	63	23.7

*Values are mean value of the group. Eight animals in each group. Data from Cohn *et al.* (3).
†Based on analyses of rats from the same groups killed at the beginning of the experiment.

over a 24-hr. period, but a number of factors, including convenience, custom, working conditions, habit, and "togetherness" soon change him into a meal-eater. It appears of utmost importance, however, both from the physiologic viewpoint and from epidemiologic and therapeutic considerations, to determine the effects of eating patterns on man.

There are some data available to suggest that man does react to the rate of ingestion of the diet as do other species. Wu and Wu have shown (17) that with an optimal protein intake, nitrogen balance varies directly with the number of feedings, i.e., there was a greater nitrogen retention with more frequent feedings. The relationship between nitrogen balance in the human being and body nitrogen in the experimental animal, as influenced by eating habits, is obvious. No studies correlating body composition and eating habits have been accomplished in man; however, studies have been performed which we interpret to demonstrate a relationship between eating habits and serum cholesterol concentrations. Hashim *et al.* showed (18)

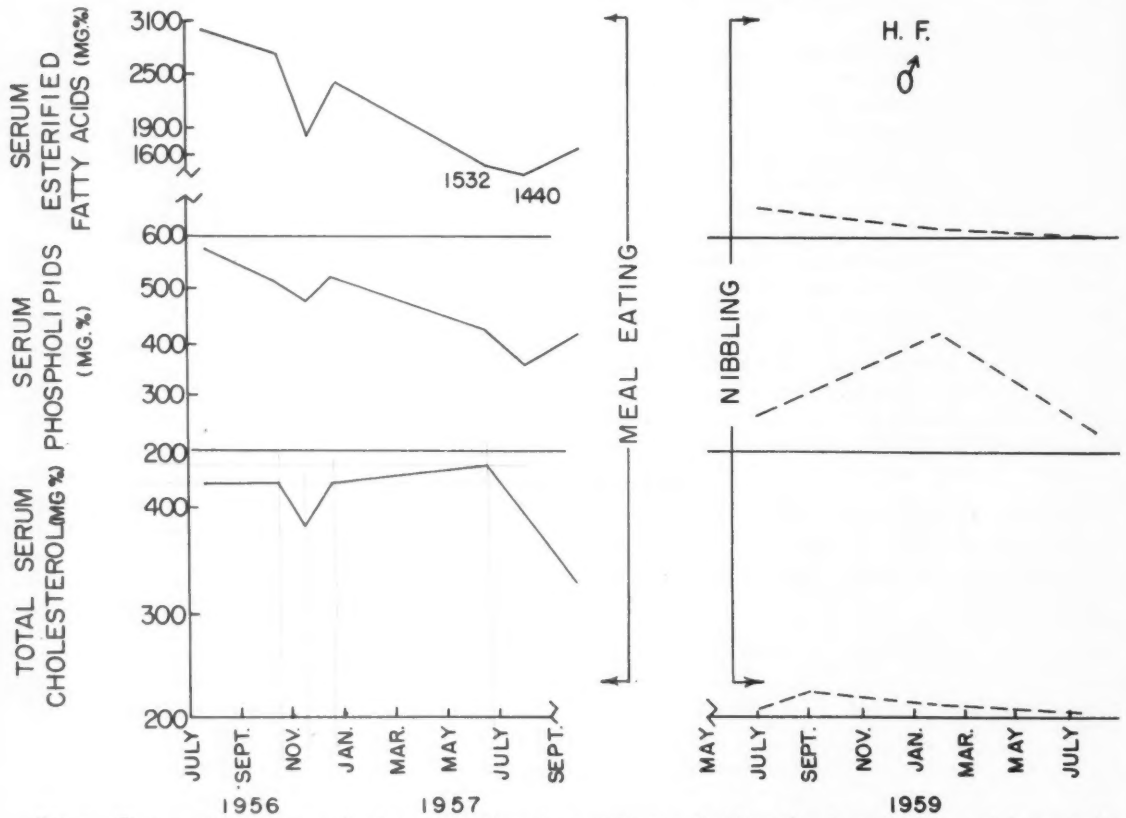

FIG. 1. *Changes in the serum lipid concentrations in a patient with idiopathic hyperlipemia and hypercholesteremia when he changed from a meal-eating to a nibbling regimen. There were no differences in dietary constituents during the two periods. Data from Cohn and Joseph (6).*

that in individuals who were changed from a three-times-a-day hospital diet to a formula diet administered six times a day, serum cholesterol levels fell regardless of the type of dietary fat (the amount of fall *did* vary with the type of fat, however). We have observed one individual with idiopathic hyperlipemia and hypercholesteremia who responded to a change from a meal-eating regimen to one of nibbling, with no difference in fat intake, with a fall of his elevated serum lipids (Figure 1). Although not dramatic in magnitude, two individuals cycled through a nibbling–meal-eating regimen twice always exhibited an elevation in thyroid I^{131} uptakes and in serum protein-bound iodine above the meal-eating levels when placed on frequent feedings. The consistent changes in the indices of thyroid function as related to eating habits lead us to believe that they have physiologic import (Table 2). The findings are similar in nature to observations in the experimental animal.

Nibbling Diets for Man

An ideal nibbling diet for man is yet to be described. It is our feeling that such a diet must satisfy at least two general principles; (a) it must be adequate in protein, vitamins, calories, and essential fatty acids and (b) fat and carbohydrate must be ingested within a limited time period after the protein has been consumed, if nitrogen balance is to be attained (19). (In this respect, it should be pointed out that every morsel consumed by the experimental animal is "complete" from a dietary viewpoint.) Three types of diets have beeen used for nibbling purposes in man: (a) The formula types described by Kinsell and Ahrens (20, 21). A diet of this nature, although ideal in several respects, including the fact that every morsel is "complete," is undesirable because it is monotonous, produces constipation, and has psychologic disadvantages, when considered from the long-term viewpoint. (b) A normal diet, divided up and eaten every few hours during the day. This diet overcomes the monotony of the formula-type diet but requires either a refrigerator, a hot plate, or a restaurant to be readily available. (c) The use of sandwiches as the basis of food intake. Through the efforts of Dr. M. D. Allweiss and Janet Cole Lordahl, dietitian, a diet (shown below) was devised that can be used with eight or more feedings daily. It requires no refrigeration, is always accessible, and if need be can be carried around conveniently. As can be seen, we have attempted to make the caloric intake per feeding somewhat the same and have spread the feedings over a 14- to 15-hr. period. The diet provides 113 gm. protein, 324 gm. carbohydrate, and 87 gm. fat. The intervals between feedings are approximately equal. However, the diet does contain too much bread.

Two facts seem to evolve from a consideration of the various diets: (a) A housewife can eat her habitual diet with no difficulty by dividing it into

TABLE 2 Effect of "meal-eating" and "nibbling" on indices of thyroid function in man

REGIMEN	24-HR. THYROIDAL I^{131} UPTAKE	PLASMA PROTEIN-BOUND IODINE	RED CELL UPTAKE OF TRI^{131} AFTER 2 HR.
	Subject D. J.		
	% dose	*mcg./100 ml.*	
First cycle			
Meal-eating	19	6.0	—
Nibbling	24	8.4	—
Second-cycle			
Meal-eating	17	6.6	—
Nibbling	21	7.8	—
	Subject L. B.		
First cycle			
Meal-eating	21	5.6	17.4
Nibbling	31	6.2	18.8
Second cycle			
Meal-eating	25	5.2	12.8
Nibbling	30	5.4	17.3

Example of 2500-calorie "nibbling" diet (times are only approximate)

7:30 a.m.—fruit juice (orange, grapefruit, or blended) –1 c.; *or* 1 whole grapefruit
skim milk–3 Tbsp. skim milk powder plus ¾ c. water; *or* liquid skim milk
dry cereal (any kind except Grapenuts)–1 pkg.

10:00 a.m.—bread–2 slices
jelly—4 tsp.

11:30 a.m.—sandwich
bread–2 slices
butter or margarine–1 tsp.
meat–2 oz.
skim milk–3 Tbsp. skim milk powder plus ¾ c. water

2:00 p.m.—sandwich
bread–2 slices
butter or margarine–1 tsp.
fruit–1 serving

4:00 p.m.—fruit–1 serving

6:00 p.m.—bouillon–1 c.
meat–4 oz.
potato or substitute–1 serving
vegetable salad–1 c.
dressing–2 Tbsp.

8:30 p.m.—fruit–2 servings
cookies (any kind)–4

10:30 p.m.—sandwich
bread–1 slice
butter or margarine–½ tsp.
meat–1 oz.
skim milk–3 Tbsp. skim milk powder plus ¾ c. water

small portions and eating at frequent intervals to suit her convenience. (b) A working individual would appear to do best on a combination of all three types of diets. It appears that each person can help in planning his own most advantageous and acceptable regimen. However, dietitians can be of immeasurable aid in devising acceptable diets and in assisting each individual to procure the diet best suited to him.

Summary

The consumption of full, spaced meals, as contrasted to frequent small feedings, results in the experimental animal in: (a) increased body fat, (b) decreased body protein and water, (c) altered thyroid and tissue enzymatic activities, (d) enhanced atherosclerosis, and (f) an increase in the severity of diabetes. Studies so far accomplished in man, with respect to body metabolism and eating habits, have yielded results suggesting that man reacts physiologically as do other species. If this fact is proved to be true, it would appear that eating habits may play a role in the pathogenesis of "metabolic" diseases. Accordingly, the need exists for nutritious, appetizing, and attractive "nibbling" diets, both for the prevention and therapy of such diseases. These remain to be planned.

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Americans today pay about the same share of their incomes for foods as before World War II—but they're eating more and better foods. In 1959, one hour's factory labor bought: 2.1 lb. round steak, 3.3 lb. bacon, or 17.6 pt. milk. Food is still a good buy. Since 1947-49, the cost of food has risen only 19.5 per cent compared with transportation costs, up 46.1 per cent; rent, up 41.4 per cent; and fuel, up 36.3 per cent.

Of every $20 spent on groceries, $1.50 to $2 goes for packaging—to keep the food in good condition and to draw the customer's attention to the product. Sometimes the package may cost as much as the food itself.—*From Agricultural Marketing, January 1961.*

Magnesium Content of Accessory Foods[1]

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THE SIGNIFICANCE of magnesium as an essential nutrient for man has not been studied to the same extent as that of other minerals. Present interest in magnesium as an essential nutrient has been focused on a re-evaluation of the human magnesium requirement (1, 2) and the possible interrelationships of magnesium with other factors (3). Increasingly, nutritionists are trying to evaluate dietary magnesium by human metabolic studies.

In a controlled dietary study, the intake of a particular nutrient is determined either by direct analysis or by the use of food composition tables. Tables giving the magnesium values of foods are incomplete; it is particularly difficult to find values for foods classified as beverages, condiments, and sweets. Since these foods may be given *ad libitum* in a controlled dietary study to increase calories or add flavor and variety to the diet, certain items in these categories were analyzed for magnesium.

Procedure

Foods analyzed for magnesium were ordered from a local grocery store. Only one brand of each food was used. Three samples or individual market units of a food were analyzed in triplicate. The triplicate aliquots of each of the well-mixed food samples were ashed in a muffle furnace at 550° C. for 48 hr. The ash was dissolved in concentrated hydrochloric acid and hot distilled water and filtered through No. 40 Whatman filter paper into volumetric flasks. Aliquots of the ash solutions were re-diluted to give the concentration of magnesium required for the colorimetric determination.

A macro-adaptation of the method by Orange and Rhein (4) for the analysis of magnesium in body fluids was used. Thiazole yellow dye was used instead of Titan yellow.

Results

The foods presented a wide range of magnesium content (Table 1). Certain of the foods, such as hard candy, orange soda, mayonnaise, salad dressing, distilled vinegar, cornstarch, and sweet pickles, would have negligible value with respect to magnesium even when ingested in large amounts; cinnamon, chili powder, and garlic salt can also be

TABLE 1 Magnesium content of edible portions of food frequently used in controlled dietary studies

FOOD	MAGNESIUM
	mg./100 gm.
Apple juice, canned	4
Buttermilk	10
Candy	
Chocolate bar (Mounds)	72
Hard (Charms)	0.5
Chili powder	191
Chocolate sirup	63
Cinnamon	59
Cookies, shortbread	14
Cornstarch	2
Garlic salt	20
Gelatin, plain, dry	33
Grape jelly	4
Grape juice, canned	12
Lemon juice, canned, unsweetened	10
Lettuce, head	10
Mayonnaise	2
Mushrooms, canned	8
Mustard, prepared	48
Oat cereal (Cheerios)	112
Onions, mature, raw	8
Orange soda	0.6
Pickles	
Dill	12
Sweet	1
Salad dressing	2
Tomato catsup	18
Vinegar, distilled	1

[1]Scientific Paper No. 1985, Washington Agricultural Experiment Stations, Pullman. Project 1409. Supported in part by a USDA contract sponsored by the Human Nutrition Research Division, Agricultural Research Service. The data in this paper were taken from the thesis of Gweneth Y. Nelson presented in partial fulfillment of the requirements for the degree of Master of Science. Received for publication June 18, 1960.

TABLE 2 Magnesium content of coffee and tea

BEVERAGE	MAGNESIUM	
	Distilled water.	Tap water*
	mg./cup	
Coffee		
Regular grind (S & W)—1½ Tbsp. coffee per cup, percolated 19 min. in electric coffeemaker	16	19
Instant (Folger's) — 2 gm. dry coffee per cup	9	13
Tea		
Bag (Lipton)—steeped 4 min.	8	11
Instant (Nestlé)—1 gm. dry tea per cup	4	7

*Magnesium content of Pullman, Washington water, 3.3 mg. per cup (1 c. = 237 ml.).

considered to be of little importance, because they are used in such small quantities. In a conventional size serving, the other foods analyzed, including chocolate bars, chocolate sirup, Cheerios, buttermilk, and grape juice, could add appreciable amounts of magnesium to the diet. The intake of magnesium from any particular food will depend, of course, not only on the amount of magnesium in that food, but also on the size of servings.

The analyses of coffee and tea (Table 2) have substantiated the fact that the magnesium content of these two beverages should be considered in a mineral balance study. Coffee and tea are often allowed *ad libitum*. If the subject is drinking many cups of coffee or tea a day, the magnesium intake from either beverage could be quite high.

In Table 3, the data from this study are compared with published values. Our results compare favorably with those in the literature.

Summary

Selected beverages, condiments, sweets and other accessory foods used in controlled dietary studies were analyzed for magnesium. *Ad libitum* intake of coffee or tea could contribute significantly to the magnesium content of the diet. Data from this study compares favorably with published values.

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TABLE 3 Comparison of published data with magnesium values obtained in this study

FOOD	SOURCE OF DATA			
	McCance and Widdowson (5)	Sherman (6)	Franz et al. (7)*	This study†
	←——— *mg./100 gm.* ———→			
Apple juice, canned	—	—	5	4
Buttermilk	—	—	11	10
Coffee infusion	10.8	—	—	7
Cookies				
Vanilla wafers	—	—	16	—
Shortbread	15.2	—	—	14
Grape juice				
Bottled	—	—	4	—
Canned	—	—	—	12
Jelly	4.4	—	—	4
Lemon juice				
Fresh	6.6	9	6	—
Canned	—	—	—	10
Lettuce, head	9.7	13	6	10
Mushrooms				
Raw	13.2	16	—	—
Canned	—	—	—	8
Onions, raw	7.6	16	—	8
Tomato catsup	—	—	23	18
Vinegar, distilled	22‡	11‡	—	1

*Garner method used.
†Adaptation of Orange and Rhein method (4) used.
‡Type of vinegar not stated.

Celiac Disease

Celiac disease is considered "an inborn error of metabolism," which becomes mainly manifest after the consumption of wheat (rye, barley, oats). Wheat gluten, especially its gliadin fraction, is the harmful substance.

The cause of the action of gliadin is sought in the glutamine-containing peptides, which, due to an enzymatic defect in the cells of the intestinal wall, would not be split normally into amino acids but would get into the blood, thus exerting an abnormal influence on the metabolism.

Abnormal elevation of gliadin-loading curves is probably based on the presence of these peptides in the blood.—*From Weijers, H. A., and van deKamer, J. H.: Celiac disease and wheat sensitivity—a review article. Pediatrics 25: 127, 1960.*

What Foods Do People Accept or Reject?[1]

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ATTITUDES ARE important in the acceptance of foods (1). There are personal or individual attitudes and beliefs, and there are group and cultural attitudes that help determine whether a person will accept a food. I propose to review some of the group attitudes and their relationship to behavior toward food.

There are many ways to characterize foods, but I will consider three. One is the class to which a food belongs, such as meats, fruits, or pastries. A second characteristic is the method of preparation, such as raw, creamed, or combined with other foods, as in a stew or combination salad. A third characteristic is the composition of the food in terms of the major nutrients and the caloric density. Similarly, there are many ways to characterize the people who eat the foods. In the present context, these will be confined mainly to demographic factors, such as age, level of education, region of the country in which they grew up, and so forth.

Attitudes are expressions of opinion or affective reactions that are usually obtained by questionnaires about foods. They may be based on reactions to particular samples of food, or, as in much of our work, they may be generalized attitudes in response to a food name and represent many experiences with that food. Much research has dealt with food preferences expressed as degrees of like or dislike for a food. Other attitudes which we have studied include: satiety, or how filling foods are; desired frequency of serving and a related question, "How long do you think you could continue to eat only the foods which you have been eating for the last X number of days?"; and attitudes toward menu combinations, phrased as, "How well do lamb chops go with baked potatoes, sweet potatoes, fried potatoes, and so on?"

Preference as a Predictor of Consumption

Although I assume that dietitians would be among the first to admit the importance of food attitudes, particularly preferences, I would still like to give some evidence of the validity of these attitudes in terms of what people actually eat. In a recent monograph (2), it was shown that various estimates of food consumption, such as the total number of normal servings consumed, or indirect measures, such as waste or leftovers, correlated between 0.5 and 0.7 with food preferences. This means that under different conditions, between 25 and 50 per cent of the variation in food consumption could be accounted for by preference alone. The predictions were not limited to military populations because there were also other studies relating preference to civilian consumption when a correction for cost was made. Again, about 50 per cent of the variation could be accounted for. In a recent report, Pilgrim and Kamen showed (3), that three-fourths of the variation in percentage of enlisted military personnel taking a food at the serving lines is predictable from food preferences, subjective satiety or fillingness, and the amount of major nutrients, that is, fat, carbohydrate or protein in the foods.

Thus food consumption is predictable, and, it has been shown that one of the important predictors is food preference, the degree of like or dislike for a food. There is also other evidence for the validity

[1]This paper reports research undertaken at the Quartermaster Food and Container Institute for the Armed Forces and has been assigned number 2069 in the series of papers approved for publication. The views or conclusions contained in this report are those of the authors; they are not to be construed as necessarily reflecting the views or indorsement of the Department of Defense. Presented at the 43rd Annual Meeting of The American Dietetic Association in Cleveland, on October 20, 1960.

of preference as a predictor of food consumption.

A topic to be discussed later in this paper is the variation in food preferences with age. We have recently obtained evidence that actual food consumption varies in the same way as the preferences do in terms of age.

Measuring Preference

At this point, it might be well also to indicate how food preferences were determined. The general method is known as the hedonic scale method (4). The subject is asked to rate each of a number of foods, in terms of the food name only, on a nine-point scale ranging from "like extremely" through "neither like nor dislike" to "dislike extremely." The number 9 is assigned to the phrase "like extremely" and successive integers to the other phrases on down to 1, which applies to "dislike extremely." For statistical analysis, these numbers are assigned to the responses to the categories, and from them, mean ratings are computed. In each survey there was a page for obtaining background or demographic information about the respondents.

Application of the Results

Many of the results have recently been published in a monograph, *Food Preferences of Men in the U. S. Armed Forces,* (2), which gives data for more than four hundred foods on general levels of preference by food class and differences in preference in relation to demographic factors.

You may wonder if the results to be presented here relate to your problems, since they were obtained on military servicemen. We believe that feeding situations encountered in hospitals, industrial cafeterias, schools, penal institutions, and other such establishments have many elements in common with military feeding. In such situations, diets, except in unusual cases, cannot be adjusted to individual food preferences as they can be for example, by self-selection in restaurants. Further, financial resources are usually limited, so that one does not have recourse to offering wider variety and more expensive foods. The data developed in the survey for the military could be used to improve institutional menus, even though there is a question of differences in population.

The evidence indicates that Army food preferences correspond generally with those of the entire American population. However, there will be wider age ranges, and there will be differences due to factors not even considered in the surveys, such as sex, which could be expected to be important. Nonetheless, the institutional population will still have much in common with the Army population. Probably the most important common factor is that the persons involved are all part of the same American population and have been subjected to the same or similar sets of cultural influences during the developmental years.

Best- and Least-Liked Foods

Let us proceed then by starting with the most obvious. What foods are best liked, and what foods are least liked in general? It will come as no surprise to you that grilled steak, ice cream, French fried potatoes, and hot biscuits are among the best liked items. The item at the very top of the list stands almost in a class by itself—fresh milk. On the other hand, among the least liked items are mashed turnips, broccoli, asparagus, iced coffee, cauliflower, and several other vegetables. Actually few vegetables are well liked.

Nevertheless, there are high, medium, and low preference foods within most of the general food classes; for example, although most desserts are well liked, such items as raisins or raisin pie have low preference. Similarly, although such fruits as peaches are extremely well liked, the majority of the population look almost with disfavor on rhubarb and stewed prunes. Most meats are relatively well liked in this country, but lamb and fish are low preference items. However, statements about well liked foods must be restricted to the simpler preparations.

Individual Preference Variation

Before discussing variation in food preferences with such factors as the age or the method of preparation, it might be well to indicate the relationship of the variations in preference to the individual. In an earlier study (5), factor analysis was used to determine whether food preferences fell into patterns in terms of the individual respondent. It was found that the individual foods actually did fall into groups; a person either liked or disliked fruit in general and not just one fruit or another. If some individuals liked sweets and desserts and others did not, again it was for the whole class of food and not just for individual items. It was found, for example, that some people liked their meat in the solid state, that is, roast or steak, whereas others preferred creamed or casserole types of dishes.

This study demonstrated that food preferences are not capricious, despite the tremendous variation within the population. Food preferences fall into distinct patterns. Therefore, when we discuss the changes in preference for individual foods with variation in some background characteristic of the respondent, or method of preparation of the food, we can generally be assured that similar effects will occur for other persons who have a similar background or for other foods prepared in a similar manner. This fact makes our intepretation of the food preferences much more meaningful.

Effect of Preparation

There is good evidence that the more one does to an item in the way of adding vegetables, cream sauces, and so on, the less well liked the item is. This is true for preparations of various kinds of meats as well as for other classes of foods. It can be demonstrated even for those vegetables which in themselves are not too well liked, such as cauliflower or asparagus. If either of these has added to it a cream sauce or some other additional dressing other than butter, the preference is even less than for the plain buttered item.

Another generalization can also be made. When foods are put in combination, the preference is more likely to be that of the less well liked item. This is particularly true of such things as combination salads. A peach and cottage cheese salad has a low rating more like that of cottage cheese and unlike that for peaches. Thus, it seems to be characteristic, at least of the American male, to like his foods plain and simple. Although these are people's food preferences, we consider them as food characteristics because they apply in general over the total population that was sampled.

Food Preferences and Population Characteristics

Another way of looking at food preferences is in terms of their change with particular changes in the characteristics of the population. Let us consider one characteristic that applies to all people, age. We found that preference for about half of the food classes varied with age. For two classes, soup and vegetables, preference increases with age, while for the other four—beverages, cereals, desserts and fruits—preference decreases with increasing age. These results do not necessarily apply to every food within a given class, but they apply to the majority.

Another important and, of course, well known effect is that of region of origin. This is based on the locale in which the respondent grew up, that is, until he was sixteen years of age. One of the major effects is the distinction between the South and North which showed up for a number of foods. However, New England is also interesting. Not only is it low on about three times as many foods as any other area, but it also shows a fairly large number of high rating foods. Perhaps some of these results are best illustrated by the sub-classes, rices and sweet potatoes, under the starches and potatoes class. In both cases, the Southern area is high and New England low. On the other hand, the general popularity of a number of the staples of the American diet, bread and white potatoes, is reflected by the almost complete lack of variation among the various regions of the country.

The effects of level of education and size of town on food preferences cannot readily be generalized to food classes. They show their variation mostly for individual foods among the various classes. There are a few group effects with education, and these generally are represented by a downward trend, for example, among the vegetables. Vegetable combinations, such dishes as stewed tomatoes and eggplant, decrease in preference with increasing education. Also, hot condiments and sauces and several meat groups, veal, meat combinations, frankfurters, and fish decrease in preference with increased education.

With regard to size of town, three food classes show important variation, but there are few consistent trends. While some condiments decrease in preference with an increase in size of town, black olives show the opposite effect. Perhaps this involves a sophistication factor. These facts are set forth in great detail in the monograph already cited (2). Therefore, rather than repeat these specific details, I would like to turn to the problem of menu making itself.

Menu Combinations

An aspect of food preference that may be important is that of menu combinations (6). By this I mean the foods which are served together at a meal but are not actually combined. Certain traditional combinations are well known. Among these are ham and sweet potatoes, and frankfurters and potato salad. The question, then, is: "Are such preferred combinations rather common, or are there just a few unusual ones such as those mentioned?"

In another study, we set out to ask people how well certain foods went with certain other foods. The one food in the questionnaire was always a main dish or entrée, i.e., a meat or fish. With this entrée were paired examples of each of the following classes: potatoes, other starches, vegetables, soups, desserts, and salads. As might have been expected, items eaten together and usually served on the same plate showed the largest combination effects. Thus potatoes or other starches rank highest in the degree to which they are related to the main dish, i.e., potatoes or other starches compared with main dishes show the largest combination effects, and vegetables rank next. On the other hand, the effects are relatively small for soups, desserts, and salads. Again, as with the relationship of preference for individual foods to the respondent's background, we found that there are generalized effects and also effects specific to the combination. A generalized effect was that, on the average, various kinds of fried potatoes go better with fish than do moist cooked potatoes; conversely, with meat items, the moist cooked, mashed, and scalloped potatoes are preferred to fried kinds of potatoes.

We spoke earlier of the effect of the form of a food on preference, e.g., whether one has a solid-type meat or a casserole dish. With food combinations, there are apparently also effects that are due to the physical form of the meat items on the accompanying starch item. For example, rice is suitable with chopped or ground meat items, but not with solid meat. However, such a finding must not be misconstrued. Rice dishes are not well liked in this country. This has been indicated in the survey of individual food preferences. In the combination study, it is also evident that steamed rice with any of the meats does not rate very high. The only point that I want to bring out is that it does rate higher with the chopped or ground meats, even though in general, the preference for rice, no matter how it is served, is low. Although these reactions to menu combinations can be learned by means of survey or attitude-type questionnaires, I am of the opinion that in most cases, combinations do not represent a serious problem in menu planning.

Frequency of Serving

Another problem which I know is of great importance to dietitians is that of frequency of serving of food items. We have done some pilot investigation on desired frequency of serving. Within a food class, there is a fair degree of correlation between preference and desired frequency of serving. However, as one would expect, the differences show up better between food classes. Certain items, because of their role in our culture, show desired frequencies of serving that are out of line with what one would anticipate from preference information alone. A well known example of this is coffee, which is only moderately well liked, but is likely to be wanted several times a day.

There is also evidence that with a rather limited dietary, some foods can be eaten repeatedly without serious loss in preference or decline in actual consumption (7, 8). Foods that have high initial preference suffer least from monotony or repetitive consumption. Kamen and Peryam also found (7) that men who designed their own menus from a fixed, limited supply of foods were more satisfied with their meals than were a group of men for whom the menus had been preplanned by others.

Satiety

Another area which shows promise is investigation of the subjective satiety or "fillingness" properties of food. In several preliminary studies we have found satiety to be one of the better predictors of food consumption. The relationship is a positive one, that is, the more filling a food is, the more likely it is to be eaten. Subjective satiety is, in part, related to food composition, particularly caloric density. However, the content of fat, protein, and carbohydrate and the absence of water are not the only factors entering into subjective satiety. There are apparently other psychologic and physiologic phenomena involved. Where weight control problems are not involved, foods that are filling or satisfying are also the foods that are most likely to be eaten. This is true for men; I wonder if it is also true for women.

Stability of Preferences

Because we are concerned here with changing food habits, it would be well to comment on the stability of soldiers' food preferences. A number of foods have been surveyed more than once over an eight- to ten-year period.

In general, the level of preference for these foods has changed little. The first survey was conducted in 1950. At that time, new food items—frozen foods in particular—were just coming onto the market in volume, hence, were more readily available throughout the year. Since then, the market has expanded considerably, so that military men today probably have had greater opportunity to become familiar with many foods than did those even a few years ago. Nevertheless, among soldiers, such items as asparagus, broccoli, instant coffee, and fish have not increased in preference level from what they were four to eight years ago. Thus it appears that there has been little spontaneous change in food preferences, in spite of advertising and changed marketing techniques. If we are to change food preferences and food habits, it appears that it will require a very active and vigorous approach over time and not the short "nutritional campaign" type of approach.

One indicator of the problem is the percentage of men who check "not tried" for a food instead of rating it. Of course, it is not known whether they have not tried the item because they have refused it or because they never had an opportunity to try it. Nevertheless, the figures are interesting. For example, about 25 per cent of the men have not tried fried mushrooms; 20 per cent have not had clam chowder, asparagus salad with mayonnaise, or fruit cake; 14 per cent indicated that they had not tried tomato juice; 40 per cent had not tried canned chilled figs or okra; and even 30 per cent had not had buttered broccoli. Thus, in every food class, we can find examples of foods that have not even been tried by a considerable portion of the population. Part of the problem of changing food habits is undoubtedly familiarizing people with the product. Even then, although having tried them, there is no guarantee that they will like them.

Conclusions and Summary

An overview of the approaches we have used to tackle problems in food preferences and food acceptance has been given. Such information can

often be applicable to institutional problems as well as just the military.

When the information is not available, the techniques at least have been developed so that the information can be gathered by what have been demonstrated to be reliable and valid methods of measurement. The use of rating scales has been studied extensively, both by us and by others. The evidence shows that the average person or, to us, the average consumer, can readily handle these rating scales, whether for preference or subjective satiety or other characteristic. They can provide one with needed information, whether about foods or about other products. The techniques provide an economical way of obtaining information which you may need to carry out your operations successfully.

The detailed data which are already available and the techniques for obtaining new data are cited in the references.

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Land-Grant Colleges Approach 100th Anniversary

When on July 2, 1862, Abraham Lincoln signed the Land-Grant Act, he set in motion a new concept of higher education that was to have a profound effect on its purpose and philosophy.

Some have described that new idea as "knowledge for use," by all. Others speak of the new Land-Grant institutions as having brought the concept of "useful relevance" to knowledge.

The author of the act, Senator Justin Smith Morrill of Vermont, later explained it this way:

"The bill proposed to establish at least one college in every State upon a sure and perpetual foundation, accessible to all, but especially to the sons of toil, where all the needful sciences for the practical avocations of life shall be taught, where neither the higher graces of classical studies, nor that military drill our country now so greatly appreciated, will be entirely ignored, and where agriculture, the foundation of all present and future prosperity, may look for troops of earnest friends, studying its familiar and recondite economies, at least elevating it to that higher level where it may fearlessly invoke comparison with the most advanced standards of the world. The bill fixes the leading objects, but properly, as I think, leaves to the States considerable latitude in carrying out the practical details."

Someone has said that Senator Morrill "builded better than he knew." Neither he nor any of those early champions of "education for the masses" could have foreseen the educational giants that one day were to emerge as the dominant influence in American higher education with 20 per cent of the nation's college population.

From: *Fawcett, N. G.: The Land-Grant Idea. 90th annual report by the President. Bull. Ohio State Univ. 65: October, 1960.*

Research in Food Administration[1]

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New food products, new equipment, automation, increased food and labor costs, and changing food habits all challenge the dietitian to keep up with and participate in research

RESEARCH AND DEVELOPMENT are vital to progress in any field. The food service industry is a changing field closely allied to social, economic, and technologic developments. More and more individuals are living and eating together in large groups; the food service industry is emerging as big business with all the economic implications; and new food products and equipment, increased operating costs, and a shortage of trained employees make traditional and established food production and service procedures obsolete.

The common goal and obligation of those responsible for food administration is the service of nutritious, palatable, and attractive food. A knowledge of many phases of administration is necessary to achieve such an objective within the limits of the money, equipment, and personnel available. In general, research in food administration has been concerned with the effective utilization of these available resources to attain the goals defined. Much of it has involved the application of principles developed by other disciplines, and some has dealt with the development of sound management procedures. There is little evidence of fundamental research, however.

Type and Progress of Research

What has been the progress of research in food administration to date? The contribution of college and university graduate programs in institution management has been and is a major factor in research in this field (1). Only 7 per cent—or 255 studies from thirty-one schools—of the graduate theses in home economics submitted from 1948 through 1959 (2) have included some aspect of research in food administration. Of these 255 projects, 27 per cent were done in hospital food service and 26 per cent on school lunch programs; 20 per cent were of a general nature applicable to administration of any type of food or food service, while the remaining 27 per cent were distributed among college and university residence halls, commercial organizations, and smaller types of food service units.

Of greater interest was the kind of research. When the same studies were classified according to the activity involved, the distribution was:

Organization and management	17%
Acceptability and nutritional value of food	14
Financial control	13
Experimental food studies	12
Teaching and training	9
Layout and equipment	8
Personnel management	7
Work simplification	6
Curriculum and evaluation	6
Purchasing	3
Miscellaneous (merchandising, status of dietitians, menu evaluation, dietitians' responsibilities)	5

Other evidence of the type of research conducted in this field may be found in the papers published in this JOURNAL, although, of course, results of many studies are never submitted for publication. It was interesting to find that the first volume of the JOURNAL included a report of research in food administration. Since that time, 107 such studies, done by dietitians, have been published.

Perhaps of greater interest and importance is the type of research these reports represented and the trends currently affecting food administration. Half of the 107 reports have been published since 1950. In this last decade, the emphasis has changed

[1]Presented at the 43rd Annual Meeting of The American Dietetic Association in Cleveland, on October 21, 1960.

from cost control and acceptability and nutritional value of food to problems of work measurement, use of equipment, improved layout, organization and management, curriculum evaluation, and status and responsibilities of dietitians. There were also more investigations on the physical, chemical, and bacteriologic aspects of quantity food preparation.

It was also interesting to note that in nearly half of the studies, the results indicated development of general principles which could be interpreted and applied to food administration in different types of food service. The fact that many such problems are basic for all types of food services and that similarities have been recognized and emphasized indicates progress in solving some of the general problems.

Present Status

Early and sustained interest in research in food administration is apparent (1). The American Dietetic and Home Economics Associations have always included in their organizational structures sections whose members are interested in research as well as other aspects of food administration. The official journals for both associations have always encouraged publications of results of research.

Newer developments, indicative of increasing interest in such research, include the cooperative regional research being conducted with governmental aid, the organization of a society to study technical problems of food administration, the availability of grants from the food service industry and the increase in the number of graduate schools offering degrees in this area.

The American Dietetic Association

Since its organization, The American Dietetic Association has been interested in study and research in food administration. The Administration Section was one of four established at the first annual meeting in 1918 (3). Originally, this section was organized primarily to study and improve food service in hospitals. The section name has been changed to "Food Administration" and members have been encouraged to participate in projects in all phases of administration in food service departments of all types of institutions.

In 1958-59, forty-one states reported (4) some participation in projects of this Section. Members were interested in investigating staff development, design and use of equipment, layout and equipment selection, time-and-motion studies, work simplification, labor analyses, personnel training, and the dietitian's professional role. The section chairman reported that these studies are significant and recommended that they be submitted for publication when completed. Some of the surveys could provide data on which to base more extensive and intensive research. The activities and interests of state dietetic associations indicate the members' problems and give direction for research to help solve them.

American Home Economics Association

According to the *AHEA Saga* (5), having "Hospital Dietaries" on the program of the Second Lake Placid Conference in 1900 was a harbinger of the emphasis on institution administration that later became an important part of home economics. Since then, the American Home Economics Association has always had a professional section, the major interest of which is in institution administration. For some time this section has been promoting research in this field, and the programs for the section at the annual meetings have included reports of research activities. This has been the responsibility of a research chairman who, each year, lists food administration research completed or in progress in colleges and universities and administrative internships. This list has been distributed to those attending the section meetings, as well as to contributors. This activity is being continued, and plans are being proposed for a wider distribution of the report. The 1960-62 program of the Institution Administration Section of the American Home Economics Association includes as an objective the stimulation of interest in research in food administration through reviewing annually the research completed and in progress, calling attention to opportunities for research and graduate study, and promoting the publication of research studies.

North Central Regional Research

"Cooperative Regional Research" in food administration has been a recent development; its organization and progress were reviewed at the 1959 annual meeting of The American Dietetic Association by Hemphill (6). The title of the North Central Regional Project 31 has been revised to expand the research and is now "Effect of Large Quantity Preparation and Service on the Quality and Yield of Meat, Poultry Products, Vegetables, Milk and Milk Products." Projects have been approved and research is in progress for the study of beef at Ohio State and Kansas State Universities, pork at Purdue University, ham and beef at Michigan State University, poultry at Iowa State University, potatoes at the University of Wisconsin, and milk products at the University of Illinois. The technical committee for the project includes representatives of institution management from the agricultural experiment stations in the North Central Region who meet regularly to report progress, evaluate results, and plan future research. The results of two studies have been published (7, 8); others are ready for publication and will appear soon.

FACTORS AFFECTING QUALITY AND YIELD

The first objective of the project has been to investigate procedures which affect quality and yield of meat, poultry products, vegetables, milk and milk products in quantity preparation and service. Several kinds of investigation are in progress, and some data have been analyzed and the results reported.

Because overnight roasting of meat in food service units has been advocated, 10-lb. top round beef roasts were cooked in ovens pre-heated to 200°, 225°, and 250°F. to three internal temperatures. These roasts showed greater cooking losses, longer and more variable cooking times, and less yield than did comparable roasts cooked in an oven preheated to 300°F.

The effect on quality of turkey timbales prepared with uncooked, previously roasted or stewed turkey was determined. In the subjective evaluation of quality factors, the following differences in timbales were significant: (a) stronger aroma when made from previously roasted meat compared with uncooked meat (either light or dark); and for pre-stewed meat compared with uncooked dark meat; (b) more intense flavor for pre-stewed meat compared with uncooked and pre-roasted dark meat; (c) greater tenderness for uncooked meat compared with pre-stewed light meat; and (d) greater juiciness for uncooked meat compared with pre-roasted light and dark meat, and for uncooked meat compared with pre-stewed dark meat.

Seven replications of four treatments were made on 30-lb. lots of Wisconsin-grown Red Sebago and Chippewa potatoes. Holding peeled potatoes under water for 24 hr. before cooking had more adverse effect on color and flavor than did sulphite treatment. Potatoes steamed for 35 min. in a compartment steamer at 7.5 lb. pressure were cooked uniformly regardless of treatment.

The acceptability of white sauce prepared with instant nonfat dry milk in either double boilers or steam-jacketed kettles was also investigated. Preliminary findings indicated acceptable products by both methods.

Other studies have been completed but the results have not yet been reported. Preliminary research concerned portion yield and quality of pork chops as affected by the position in the loin and temperature of cooking. A comparison was made also of cooking losses, palatability, and cost of U. S. Choice and U. S. Good top round beef roasts cooked to six internal temperatures ranging from 65° to 90°C. The effect of cooking these roasts in three types of institutional ovens, as well as their position in the oven, was also investigated. Data have also been collected on the effect of large quantity preparation and service on cost and palatability of five styles of cured ham.

METHODS TO IMPROVE PALATABILITY AND MINIMIZE WASTE

The second objective of the project is to ascertain methods of quantity food preparation and service which will improve palatability and minimize waste. The following results have been reported.

U. S. Choice beef round cooked in an oven preheated to 300°F. yielded a satisfactory product. Ten-lb. roasts proved more satisfactory than did either 5- or 15-lb. pieces. Data regarding the relationship of oven temperatures, internal cooking temperatures, U. S. grade, size, and cut of meat to palatability and cost per serving are now being analyzed and summarized. The use of uncooked turkey in turkey timbales decreased preparation and labor time and equipment use. To ascertain methods for preparing potatoes with acceptable qualities, studies are being continued to determine the optimal time peeled potatoes can be held before steaming without adversely affecting the quality of the cooked potato.

RECOMMENDATIONS FOR STANDARD PROCEDURES

The third objective is to formulate recommendations for standard procedures in the quantity preparation and service of quality foods.

Analyses and interpretation of data have indicated that for thawing frozen 20- to 22-lb. turkeys in a refrigerator at 38° to 40°F., approximately 72 hr. should be allowed; and for a half turkey of the same size range, approximately 68 hr.

For roasting or stewing turkeys, an internal temperature of 185°F. in the pectoralis major muscle should give a satisfactory product. For uniform cooking of potatoes in quantity, research to date has shown that frequent regulation of the steamer valve for optimal pressure is necessary.

On completion of the collection and interpretation of data, recommendations will be made for such factors as optimal oven temperatures and internal temperatures, size of cut, style of cut, U. S. grade, and cooking times of top round beef roasts, center loin pork chops, and hams.

The research planned for 1960–61 includes, in addition to the studies in progress, investigation of: utilization of instant nonfat dry milk in white sauces, cream soups, and casserole dishes; the effect of freezing on cooking time, cooking losses, and palatability of U. S. Choice and Good top round roasts cooked to three internal temperatures; methods of heating portions of roast beef for service; the effect on quality of roasting of combination light and dark meat turkey rolls in aluminum foil, using three oven temperatures; quality, yield, and total cost of fresh and dehydrated potatoes prepared in quantity.

Interpretation of the statistical evaluation of the effect of quantity preparation and service on cost

and palatability of six styles of cured ham will be completed, and a new project to determine the effect of different preparation methods on cooking losses, palatability, and rate of cooking of selected muscles of beef has been started.

The master project will be evaluated in terms of the work completed, possible revision, and the publication of findings. The data obtained from these regional research studies should help food service managers to improve and standardize preparation techniques, control the quality and cost of products made from the foods studied, and plan efficient work schedules.

Industry

Those interested in the problems of commercial food service are also promoting and supporting research in food administration. In March and September of 1958, a group of research-minded persons representing a cross section of the food service industry, equipment manufacturers, government agencies, and institution management faculty from colleges and universities met at Michigan State University. Out of these conferences developed the "Society for the Advancement of Food Service Research." This Society was organized to bring together persons engaged in or interested in research, provide opportunity for exploration of problems of mutual interest, study problems, identify areas for and stimulate research, act as a forum for presentation of reports, publish proceedings and professional papers, and establish a professional journal. Representatives of institution management faculties, as well as other members of The American Dietetic Association, are not only charter members but actively engaged in the activities of the Society.

In May 1959, *Institutions Magazine* established a Food Service Foundation to provide fellowships and funds for research in quantity food production and service. Grants have been and will be made to colleges and universities. Cooperation in research with industry can result in encouragement and financial support as well as recognition of the contribution of dietitians to the industry.

The National Restaurant Association is also helping to sponsor and support research at the Food Service Industry Research Center at Michigan State University.

Challenge for the Future

Changes are taking place today in our economy which affect all aspects of food administration. These changes have brought about, among other things, new food products, new equipment, automation, increased operating costs, and changes in food habits. These developments in turn are making it necessary for food service departments to evaluate their organization and management procedures. To bring food administration to the level of development of other major industries will require not just research and development programs, but a change in the trend of research.

The change brought about through the current economic, sociologic, and technologic developments will call for many types of research. Hundreds of new food products are being distributed. How does the person responsible for purchasing make a selection on a scientific basis? Consumer marketing research assists the retail buyer, of course, but few studies have been done which consider the food service department as the consumer. There should be no limit to the possibilities for marketing and consumer studies for institutional food products. We need to determine the relationships of quality and cost of commodities and services to their acceptance and use by the institutional consumer. Rational use of our resources to meet our goal of serving quality food is an important aspect of administration. The graduate schools participating in the North Central regional research project are helping to meet this challenge.

New food products as well as other technical developments have brought about changes in the equipment needs, both as to type and layout. Evaluation of these developments is as important as for the new food products. No longer can we follow the traditional standards for space allowances, layout, type, and capacity of equipment. High capital investments, shortage of skilled labor, and higher labor costs are factors which will influence the direction equipment research will take.

Equipment research to date has been primarily product development. Blaker has stated (9) that future equipment research will be concerned with space design and ways to combine, consolidate, and make equipment multi-functional. One such study has been started in the Food Service Industry Research Laboratory at Michigan State University. There is also a need to study the possibility of adapting principles and techniques of laying out production areas used in other industries. Such research has been reported from Cornell University, where the use of cross charts and mathematical methods of determining kitchen layout have been investigated (10).

People are breaking away from traditional, conservative dining habits. Those responsible for menu planning need to be aware of these changes to learn how to satisfy the need of the groups being fed, and to study the nutritional implications as well as the administrative aspect of the changes.

To what extent do the changes in our economy and the consequent changes for effective organization and management of the food service department alter the job classifications for personnel? How the responsibilities of the dietitian and, in turn, the professional and educational requirements? Is

is the shortage of dietitians changing the role of the dietary department and its contribution to food service administration? These are other aspects of research in food administration which are most important for the future of the profession.

A study of academic preparation for food service management conducted at Michigan State University has been published recently (11). This research was planned to help evaluate the academic program for food service management and reveal positive directions for appropriate revision of curriculum.

Two studies at the University of Wisconsin used the work sampling technique for evaluating dietary department responsibilities. In one, the work activities of some hospital food service employees were analyzed to provide information for more effective classification and scheduling of the employees (12). The purposes of the other study were: (a) to develop a work sampling technique for classifying and analyzing management activities of dietitians and of food production managers working at the middle management level, and then (b) to determine management responsibilities of food production managers and attitudes regarding their professional education (13). At Iowa State University, a study has been designed to determine and define the amount and type of higher education and experience to be recommended for qualifying managers of single-unit and directors or supervisors of multiple-unit school lunch programs (14).

The use of new food products, changes in equipment, and automation bring other problems. There is need for research in the sociologic and psychologic aspects of these changes in regard to personnel. We need to study the psychologic impact of technologic change on individuals. What is the effect on employees who can no longer capitalize on skills built up over a period of years? In some industries, research is being conducted to examine the reaction of employees to major changes in production methods (15). This could provide an interesting avenue of research in the food service industry.

These are only a few of the many challenging facets of research in food administration. Now is the time to evaluate our achievements, to become more aware of current trends, and to change our research and education to new directions. All the changes that characterize our world today make it imperative that we be concerned with many types of research related to food administration.

Opportunity and Responsibility

Because some of the problems we must solve involve principles, techniques, and understanding in more than one field, we will need to use an integrated approach. The professionally educated dietitian has a real opportunity—yes, and responsibility—to make a unique contribution by initiating, planning, and conducting research activities to develop new and improved methods of organization and management of food service. This can be achieved in cooperation with specialists in other disciplines, such as personnel management, industrial engineering, physics, sociology, psychology, economics, education, and food technology.

Research traditionally has been conducted in the academic environment. Today it also flourishes in industry and government.

Members of the profession who are actively engaged in food administration can and should take responsibility for giving impetus to research. In an article discussing the changing role of the dietitian, Johnson said (16) that progressive hospitals are using a research attitude toward *all* of their activities. The commercial food service industry is supporting research and development. Gleiser questioned (17) whether food service organizations will consider a research and development department as important as do the large industries. Industry employs a million scientists and engineers for research and development (18), and this phase of a business is considered one of seven factors involved in making an organization efficient.

Do we need to consider more seriously the development of the research attitude in food administration? The professionally educated dietitian can contribute toward the development of such research in several ways. Should there be more emphasis in the internship program on research and development in administration rather than on just the routine of food production? Perhaps more time could be spent in planning, initiating, and conducting studies to improve the organization and management of the food service. The goal could be to use resources more effectively rather than for some of the routine duties which might be delegated to non-professional personnel. Suggestions for problems which take more concentrated research and analysis might be directed from food service departments to the research departments of universities. Dietitians could open their departments for research studies conducted by universities and government agencies. To develop a research attitude towards food administration, perhaps hospital food service departments as well as other food service organizations will need to provide time for more dietitians working in food administration to do graduate study and research.

There is a greater need than ever for sound methods of research and development (19). Dietitians need to be aware of possibilities for research in food administration and for adoption or adaptation of results of research to the solution of their own administrative problems. If the needs of the people we feed are to be met, if the profession is going to

rise to the challenge of other professions and industries, if efficient means of providing satisfaction and service are to be developed, then more research is needed to provide the key to solving the problems. Eppright has said (20) that research is the life blood of a profession. Research supplies the knowledge which makes service possible. Only as a profession acquires a body of knowledge and uses it for the benefit of humanity does it qualify as a profession.

If research is to be important in the development of food administration, persons who do research have an obligation to make results available. In turn, those actively engaged in food administration have an equal obligation to study and adopt the results of research as well as to develop the research attitude and suggest problems for future research.

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Sour Cream

Sour cream is defined as a light cream of custard-like consistency with a characteristic, tangy flavor produced by the addition of a culture or lactic acid starter. The starter is the same as that used to make cultured buttermilk.

The souring process in no way affects the food value, and sour cream has the same food value as the light sweet cream from which it is made. Sour cream contains approximately 30 calories per tablespoon. The approximate composition of 1 tablespoon of sour cream is:

Protein	0.4 gm.
Fat	3.0 gm.
Total carbohydrate	0.6 gm.
Calcium	15 mg.
Phosphorus	12 mg.
Vitamin A	120 I.U.
Riboflavin	0.02 mg.

Sour cream should be stored in a tightly closed container in a refrigerator where the temperature is maintained at 35° to 40° F. A perishable product, it should be placed in the refrigerator as soon as possible after delivery.—*From Borden's School Nutrition Topics 22: 1 (Jan.), 1961.*

Holding Temperatures and Food Quality[1]

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THE U. S. Public Health Service is currently proposing a revision of the Ordinance and Code Regulating Eating and Drinking Establishments. While the present code requires that certain foods be held at 140°F. and certain refrigerated foods be maintained at 50°F. or below, the proposed code will require *all* hot foods to be maintained at 140°F. or over, and *all* refrigerated foods at 40°F. or below.

If the proposed code is adopted, the food service operator is immediately faced with these questions: (a) Will the presently available heat-holding equipment maintain hot foods at 140°F. for the required period? (b) How long can various types of food products be held at 140°F. and still retain acceptable quality?

Investigation of the literature revealed a prolific quantity of information on the pathogenic properties of food, but only a meager amount of data on the effect of holding temperature on the retention of quality (1). To answer the above questions, it was necessary to learn at what temperatures hot foods were currently being held in various types of food service establishments; to survey the kind of heat-holding equipment being used; and to record visible changes in color and consistency, surface drying, scum formation, crusting, and so on, which would indicate a down-grading of quality.

Procedure

Four types of food establishments were studied:

Table-service dining room	dinner, 5 days
College pay cafeteria	lunch, 5 days
Commercial cafeteria	dinner, 1 day
Industrial cafeteria	lunch, 1 day

Temperatures of food held on steam tables were recorded at 15-min. intervals with the aid of a Weston testing thermometer (range 0°—220°F.), which required approximately a 2-in. insertion for accurate reading. The initial reading was taken in the center of a full pan, with succeeding readings from the center of the remaining mass. Thermometers were swirled continuously in the center of the mass while the temperatures were being taken. All liquid items were stirred before temperatures were recorded.

If possible, the temperature of each item at the end point of cooking or just prior to the food being transferred to the steam table was obtained. Since the purpose of the study was to record temperatures of food as they occurred under usual operating conditions, no attempt was made to regulate or schedule food production. The recorder reported to the unit at a time prior to the meal designated by management as the usual time when food items would be completed and ready for heat-holding storage. She then remained throughout the entire serving period. In some instances, food items were completed ahead of schedule and the recorder was unable to obtain the end point temperature.

The following types of steam tables were used:

Table-service dining room	wet steam table
College pay cafeteria	wet steam table
Commercial cafeteria	wet steam table
Industrial cafeteria	electric dry table

The type of container in which the food was held and/or presented on the steam table was noted. The temperatures recorded do not represent the temperatures of one pan of any given food item for the entire serving period. Each new pan of food brought to the steam table was indicated.

No attempt was made to obtain the water-bath temperatures of the wet steam tables or air temperatures of the dry tables. In no instance did the recorder attempt to regulate the operation of any heat-holding equipment.

Observations and Discussion

The control of each compartment of the electric dry table was set at No. 5 for the entire holding period,

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while the temperatures of the wet steam tables were controlled by opening and closing the steam valves. The general procedure was to open the valve as far as it would go at the time the steam table was filled. When steam began escaping around the counter inserts, the valve would be partially or completely closed. In most instances, escaping steam would cause the sneeze plates to fog and thereby make it impossible for the customer to see the food. This condition invariably caused the employee to turn the steam down or off completely.

The following observations were made concerning temperature of foods held on steam tables (Table 1).

Temperature fluctuations were observed in all food items at 15-min. intervals. There was less fluctuation in those items that were (a) held in deep containers with small surface area exposed; held in a large piece and carved to order; or were of compact consistency and/or covered with sauce or gravy.

Food brought to the steam table at 160°F. or above showed a gradual drop in temperature over an extended holding period (45 min. or longer), but in most instances remained well above the 140°F. mark. This was most noticeable when pans remained uncovered and the steam was turned down or off. Those foods brought to the steam tables at 150°F. or below usually showed a continued temperature rise during extended steam-table holding. This rise was particularly marked when the product was in a deep pan, covered, and the steam was on.

Foods prepared in one continuous cooking operation, with the end point of cooking geared to the start of the meal period tended to come to the steam table at temperatures well above the 140°F., usually at 160°F. or above; those prepared from pre-cooked and cooled ingredients and reheated just prior to serving time, at 140°F. or below. This type of item is usually covered with hot gravy, sauce, or buttered crumbs and browned, and the end point of cooking is judged by the degree of brownness rather than internal temperature. In most instances, the "degree of brownness" was not a good criterion of internal temperature—particularly if ingredients were at refrigerator temperature just before browning.

Food products, liquid in nature or covered with a liquid, such as a sauce or gravy, did not appear to undergo any change in quality at temperatures of 150° to 160°F. It would appear that products made without milk or cream could withstand much higher temperatures without any observable loss in quality.

Cream soups were not observed above 160°F. Operators usually held this type of product in a double-pan to protect it from excessive heat.

Mashed potatoes took on a waxy appearance at temperatures above 150°F. after 20-min. holding. Higher temperature and/or long holding periods on wet steam tables caused the potatoes to become stiff, crusted, and discolored from the top. In electric dry tables, the crusting and discoloration started at the bottom of the pan and was much more severe.

Cereal products, such as rice and noodles, showed evidence of drying and discoloration at temperatures of 160°F. and above, after 30- to 45-min. holding.

Sliced meats (without *au jus* or gravy) appeared dehydrated above 160°F. after 15 min. This was particularly noticeable in meat which had been reheated and held in the steamer prior to steam-table holding. Portioned meats without gravy showed evidence of drying after 30 to 45 min., especially if items were held in a warm oven before being put on the steam table. This was less noticeable if the products were held in a heat-holding cabinet.

Green vegetables cooked in an open kettle were slightly discolored after 30 min. on the steam table (if there had been no intermediate holding), but were markedly discolored in 15 min. if held in a heat-holding cabinet for even 15 min. prior to being brought to the steam table. The degree of discoloration appeared to be affected more by holding time and temperature than temperature alone, i.e., green vegetables taken directly from the cooker at 190°F. and served within 15 to 30 min. showed no discoloration. Vegetables at 142°F. after 30 min., either on the steam table, in a heat-holding cabinet, or both, showed discoloration. Vegetables held over 45 min. at high temperature discolored most.

There was no discoloration in yellow vegetables, although there was evidence of drying after 1 hr. on the steam table above 150°F.

Baked sweet potatoes became soggy and shriveled after 1 hr. at 160°F., either on the steam table or in a heat-holding cabinet.

With extended holding, all vegetables tended to become overcooked, soft, and mushy.

LABORATORY STUDY

Many of the food items did not remain on the steam table long enough to determine adequately: (a) the effectiveness of the steam tables in maintaining temperatures or (b) the effect of holding time and temperature on quality. It therefore seemed necessary to make these determinations under laboratory conditions.

Each day seven food items were prepared and placed on a steam table for a 2½-hr. holding period: a green vegetable (different one each day); roast beef (daily); baked ham (daily); mashed potatoes (daily); a cream soup (different kind each day); and two "made" entrées and/or baked vegetables (daily).

The tests were continued for four days. During this period, seventeen items were studied. Internal

TABLE 1 Temperatures of food items held on steam table, recorded at 15-min. intervals, in a table-service dining room, a college pay cafeteria, a commercial cafeteria, and an industrial cafeteria

MENU ITEM	CONTAINER†	TEMPERATURE										
		First reading	15 min.	30 min.	45 min.	1 hr.	1 hr. 15 min.	1 hr. 30 min.	1 hr. 45 min.	2 hr.	2 hr. 15 min.	2 hr. 30 min.
Table-Service Dining Room												
		°F.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	°F.
Entrées and accompaniments												
Beef loaf	½ S	186	180	172	166	152	150	150	136	138	144	146
Creole sauce	1 B	—	194	186	182	176	165	160	156	166	144	142
Fried chicken	LS	176	176	160	148	148	158	164	170	160	152	136
Cream gravy	1 B	174	174	176	176	166	158	152	164	170	160	146
Lobster thermidor	LD	—	156	156	152	160	152	146	128	126	120	114
Sauerbraten	½ S	166	166	164	150	146	142	146	134	136	138	128
Veal cutlet, breaded	LS	180	176	162	190	170	166	172	166	132	140	136
Noodles	1½ B	122	146	126	150	164	156	164	160	144	144	142
Vegetables												
Buttered green beans	½ S	210	178	160	160‡	176‡	156	154	166‡	156	170	154
Buttered carrots	½ S	194	170	170	158	154	148	146	152‡	160	166	160
Potatoes												
Browned	½ S	176	159	160	144	140	132	134	131‡	138	136	130
Whipped	½ S	140	150	166	150	134‡	142	150	176	150	152	142
Cream of spinach soup	1½ B	140	142	146	160	160	156	158	160	160	158	158
College Pay Cafeteria												
Entrées and accompaniments												
Sliced beef for sandwich	½ S	—	—	132	170	195	180	166	158‡	126	156‡	158
Gravy	1½ B	—	196	196	182	188	170‡	172	170	169‡	172	170
Spare ribs	LD	—	192	170	149	170	150	120	—	136‡	148	124
Sauerkraut	½ D	—	190	186	176	170	178	160	148	158	156‡	170
Steakette	½ S	—	—	160	152	176	186‡	172	160‡	146	148	138
Vegetables												
Mashed potatoes	½ D	—	150	150	156	160	160	162	146‡	152	140‡	148
Spinach	1½ B	—	198	186	175	182	176*	170	170	170	164	164
Soups												
Chili	1½ B	156	162	160	167	164	164	172	196‡	178	176	172
Vegetable	1½ B	196	196	196	190	192	186	176‡	178‡	176	166	out
Commercial Cafeteria												
Entrées and accompaniments												
Beef slices on noodles	LS	158	140	146	123‡	140	126	122‡	138‡	140	140‡	142
Fried chicken	LS	148	144	140	150‡	138	122‡	116	158	132‡	130	130
Chicken gravy	1½ B	168	172	172	170	176	170	174	166‡	164	168	170
Ham slice and pineapple	LS	128	152	124‡	146	172‡	144‡	132‡	130‡	132‡	154‡	154
Prime rib of beef	½ S	100	110	140	142	144	118‡	122	126	140‡	111‡	92
Pork chops and dressing	LS	140	152	144	140‡	152	142‡	140	140‡	146	140‡	128
Chopped steak with pineapple slice	LS	130	136‡	126‡	132‡	142‡	124‡	142‡	136‡	126‡	150‡	144
Turkey and dressing	LS	122	130	142	118‡	130‡	122‡	104‡	142	140‡	152‡	122
Veal cutlets	½ S	—	162	150	142	148*	150	165*	154*	165*	158	156*
Vegetables												
Baked beans	½ S	156	146	146	152	154‡	138	out	out	out	out	out
Harvard beets	½ S	160	144	132	140‡	156	140	144	148	low	142	142
Corn	½ D	170	160	150	156	152	150‡	156	146	164‡	160	146
Mushroom sauce	1 B	—	—	136	136	low	152	144	136	low	150	136
Buttered onions		substitution					142	156	out	out	out	out
Buttered peas	½ S	196	172	156	170‡	182	168‡	176	158‡	152	low	out
Potatoes												
Escalloped	LS	166	172	145	150‡	150	160‡	160‡	156	out	out	out
Mashed	½ D	156	152	136‡	146	139‡	138	146‡	126‡	140‡	138	142‡
Mashed squash	½ S	142	152	134	132	142‡	out	out	out	out	out	out
Chicken noodle soup	½ D	164	166	152	156	154	148	out	out	out	out	out
Industrial Cafeteria												
Entrées and accompaniments												
Fried chicken	LS	160	—	—	146	136	110	112	142‡	122	116	130‡
Chicken gravy	1½ B	182	—	—	190	180	186‡	173	170	166	160	160
Chow mein	LD	166	—	—	162	173	158	172‡	179	172	160	160
Hamburger	LS	172	—	—	160	156‡	140‡	170‡	156‡	154‡	148‡	138‡
Brown gravy	1¼ B	166	—	—	184	178	180	172	176	176	172	176
Vegetables												
Wax beans	1½ D	208	—	—	192	190	188	170	159	150	low	low
Broccoli, cuts and tips	1½ D	176	—	—	140	134	164	130	130‡	148‡	139	out
Corn	½ D	160	—	—	144	146	160‡	158	154	146	130	152
Mashed potatoes	½ D	—	—	—	182	182	172‡	178	172‡	176	128	140‡
Soups												
Chicken	1½ B	196	—	—	176	168	168	166	172‡	166	180‡	180
Tomato bouillon	1½ B	198	—	—	176	176	174	172	172	170	166	168

†Coded as follows:
LS = long, shallow
LD = long, deep
½ D = deep, ½ pan
1½ B = 1½-gal. bootle
1 B = 1-gal. bootleg
½ S = shallow ½ pan

*Representative of data collected.
‡Indicates replenishment with new pan of item.

temperatures of six were recorded daily by means of a recording potentiometer. Water-bath and internal temperatures of the beef roast were recorded at 15-min. intervals by means of Weston testing thermometers (range 0°—220°F.). The thermometers were positioned at the start of the holding period and remained in place throughout the test. Visible quality changes were also noted at quarter-hour intervals. Where appropriate, food items were stirred every 15 min.

With one exception, temperatures fluctuated in all items. These fluctuations, however, were not as frequent or as dramatic as those observed and recorded under regular operating conditions. In most instances, less fluctuation was observed in items held (a) in deep containers with a small surface area exposed, or (b) in a large piece (roast).

In most instances, the temperature of foods placed on the steam table at 170°F. or above gradually declined but seldom went below 140°F. within a 2-hr. holding period. The decline was accompanied by a decline in water-bath temperature.

Roast beef and baked, precooked ham were brought to the steam table at 140°F. and 150°F., respectively. As expected, the meats continued to cook and a rise in temperature was observed for a 15-min. interval with the ham and for a 45-min. interval with the beef. Thereafter, a slow decline occurred. In spite of a low initial temperature, both items remained above 140°F. for 1½ hr., and the beef remained above this temperature for 2 hr. The only visible change in quality noted in roast beef and baked ham after 2½ hr. was a small amount of surface drying. It should be noted that the meat remained intact in both cases; more rapid cooling would be expected if the meat were carved during the holding period.

Slices of roast beef and ham placed in *au jus* showed evidence of surface drying after 15 min., and sliced rare roast beef became well done within this time. In sliced beef covered with beef gravy held for 2½ hr., the only visible change in quality was surface drying and scum formation.

Escalloped potatoes and ham and creamed ham were held for 1¼ hr. without visible change in quality. Thereafter, both items became creamier in color and evidenced surface drying and scum formation. Curdling was observed after 2½ hr.

Mashed potatoes were prepared from potato flakes and hot, seasoned milk. Even though the milk was heated to 200°F. or above, it was impossible to prepare the potatoes and move the product to the steam table at temperatures above 140°F. Only one shallow half-pan was prepared at a time. This small-size batch may explain the rapid loss in initial temperature. In all instances, the temperature increased during the first 30 min. on the steam table. Three of the four samples remained above 140°F. for 1¾ hr., despite low initial temperature, but the fourth sample maintained this temperature for only 30 min. Inasmuch as the quality of potatoes deteriorates rapidly, it appears that the holding period for this product should not extend beyond 30 min.

TABLE 2 Visible changes in quality during 2½ hr.-holding on a steam table

FOOD	SOME FADING IN COLOR	DISTINCT COLOR CHANGE	OVER-COOKED
	min.	*min.*	*min.*
Peas	30	50	30
Green beans	30	60	30
Asparagus	45	75	30
Broccoli	60	75	30

Four different green vegetables were cooked until tender but still slightly crisp. They were placed on the steam table in the laboratory for 2½-hr. periods. Visible changes in quality were checked against a control at 15-min. intervals (Table 2).

Visible changes in four soup samples were checked against a control and observed at 15-min. intervals. No visible change in quality was observed for the first hour of holding. After 60 min., however, all cream soups became darker but at no time was there any evidence of curdling.

Conclusions

Observations in four operating units indicated that steam tables (wet or dry) were able to maintain cooked foods at temperatures of 140°F. or above for at least 1 hr., if the food came to the steam table at 160°F. or above. This holding time could be extended to 2 hr. if the steam were not turned off during the serving period.

Steam tables (wet or dry) provided sufficient heat to increase the temperature of foods brought to the steam table at 140°F. or below. The rise in temperature depended on the time the food remained on the table and the physical make-up of the product. The rise tended to level off at about 160°F. for most items, but this was true only if the steam were not turned off during the serving period.

The wet steam table was more efficient in increasing or maintaining temperatures with minimum quality damage to the food product than the dry steam table.

The fluctuation in food temperatures at 15-min. intervals helps further to point up the difficulty in measuring accurately the temperatures in semi-solid foods, and the need for developing standard techniques to do this.

At present, the operator has no practical or reasonable method of controlling steam table temperatures, other than careful training and supervision of responsible employees. Since the quality of food held on the steam table apears to be affected by a time-temperature relationship, and since the holding time to some extent will always be deter-

mined by customer preference, it would seem that development of adequate and accurate temperature controls for steam tables is most essential.

Steam escaping around counter inserts creates problems of visibility, employee and guest discomfort, and the possibility of steam burns. This factor undoubtedly is the cause of wet steam tables being operated at temperatures below those needed to maintain food at desired temperatures. It would seem pertinent then, to investigate methods of sealing sectored surfaces which are used successfully in other industries and to adapt appropriate methods of sealing to steam tables.

The factors necessary to produce top quality food at temperatures most acceptable to the customer are the same needed to produce safe food. Thus, the food service operator who adheres to recommended preparation procedures, temperatures, and holding times should be able to meet both the standards of quality and of wholesomeness.

Reference

(1) Study desirable food serving temperatures. Institutions 37: 101 (Nov.), 1955.

BIOGRAPHICAL NOTES ON THE HISTORY OF NUTRITION

Harry James Deuel, Jr. — October 15, 1897 – April 17, 1956.

Harry Deuel was a young man who obtained his bachelor's degree from Carleton College in 1918 and began a long career of research in foods and nutrition, starting as a junior chemist in the Office of Home Economics of the Department of Agriculture.

Harry James Deuel, Jr., was born in St. Paul, on October 15, 1897, the son of Harry James and Myrtle Lillian Deuel. From his early work with Langworthy at the Department of Agriculture, he went on to Yale University and obtained his doctorate (1923) under Lafayette B. Mendel. His thesis, "The Metabolism of Some Pyrimidines," was published in the *Journal of Biological Chemistry*. The next five years were spent in the Department of Physiology at Cornell University Medical Center, where he worked with Graham Lusk and was coauthor with him of seven papers on animal calorimetry. He also read the proof and prepared the index for the fourth edition of Lusk's *The Science of Nutrition*. During this time (1925), Deuel was a special student at the Mayo Clinic and was the subject for a metabolic study of the nitrogen minimum and lived for sixty-three days on a protein-free diet.

After a year at the University of Maryland Medical School as Professor of Physiology, Harry Deuel joined the faculty of the University of Southern California (1929) as Professor and later Head of the Department of Biochemistry. His first work was concerned with the metabolism of fat and carbohydrate. His extensive researches on fats and his three volumes on the chemistry, metabolism, and nutritive value of the lipids marked him as an outstanding authority in this field. The vitamins, especially vitamin A and the carotenes, engaged his interest and he demonstrated that the intestines rather than the liver were the site of conversion of carotene to vitamin A. Other research studies led to the use of sorbic acid as a fungistatic agent in food packaging, and the acceptance of isopropyl and stearyl citrates for the prevention of flavor reversion in fats and oils. Over 280 scientific papers and books are evidence of Dr. Deuel's research studies.

In 1949, he became Dean of the Graduate School of the University of Southern California. He was elected to the board of directors of Annual Reviews, Inc. (1946) and became President of the Board in 1953. In 1949, he received the Borden Award of the American Institute of Nutrition; in 1954, the Monsanto Award of the Institute of Food Technologists; and in 1955, an Honorary Award of the University of Brussels for achievements in the field of medicine. In the summer of 1955, though handicapped by removal of one leg because of a sarcoma of the hip joint, he lectured in England and Europe under a Fulbright fellowship. He was elected President of the American Institute of Nutrition on April 17, 1956, but he died a few hours after this final honor was conferred on him.

Harry Deuel was a warm hearted, friendly person of great energy and enthusiasm. The laboratories where he worked at the University of Southern California have now been named the Harry J. Deuel, Jr., Laboratories and an award is made each year in his name at commencement to a doctoral candidate.

REFERENCES: Luck, J. M.: Harry J. Deuel, Jr., student of nutrition. Science 124:209, 1956; Roe, J. H.: Dr. Harry J. Deuel, Jr. Ann Rev. Biochem. 26:7, 1957; Mehl, J. W.: Harry James Deuel, Jr. J. Nutrition 65:3, 1958.—*Contributed by E. Neige Todhunter, Ph.D., Dean, School of Home Economics, University of Alabama, Tuscaloosa.*

Holding Temperatures Needed to Serve Hot Foods Hot[1]

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CERTAIN FOODS and beverages are best when served and consumed cold; others are preferably eaten warm (hot). This study concerns warm (hot) foods—more particularly, the temperatures at which hot foods should be held so that they will be at the most desirable temperatures when the guest starts eating.

Time elapses between the moment foods are dished up and the moment the guest begins to eat. During that interval, foods and beverages cool. Consequently, they must be held at a temperature above that at which the guests prefer to eat them.

In order to determine the proper holding temperatures, it becomes necessary to determine:

(a) Preferred eating temperatures for foods and beverages.

(b) Cooling rates of foods and beverages after being dished up.

(c) Time between dishing up and eating.

Preferred Temperatures

A study was undertaken to ascertain temperatures at which individuals prefer to eat foods. Four classes of foods were studied: soups, vegetables, entrées, and beverages. The procedure was designed to learn both the temperatures at which the members of a panel preferred these items and at which they expressed a dislike for them.

The results are illustrated in Figures 1 to 3. The unshaded areas show the temperature distribution at which individuals disliked foods, while the shaded areas indicate temperature distribution at which foods and beverages were preferred. The vertical line marked "M" is the median temperature within the preferential temperature zone.

[1]Funds for this research were furnished through the Schlitz Academic Achievement Fund. Received for publication June 14, 1960.

From these data, it appears that individuals prefer to eat hot (warm) foods within a certain temperature range (1). The ranges for the four classes studied were:

Soup	145-150° F. (not shown)
Potatoes and vegetables	140-145° F.
Entrées	140-145° F.
Beverages	145-150° F.

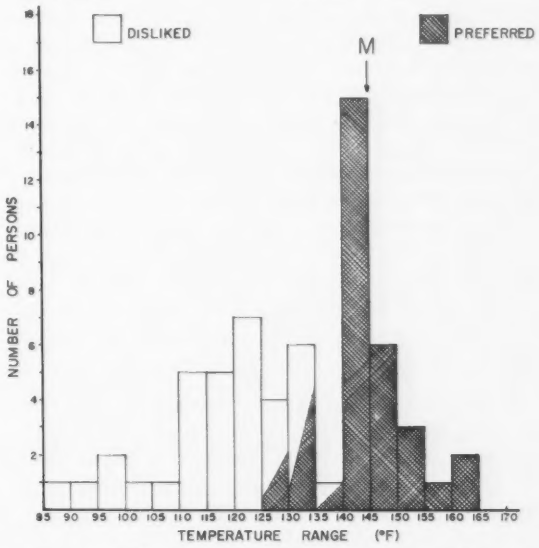


FIG. 1. *Temperature range of acceptability for potatoes and vegetables.*

Time Elapsing between Dishing-Up and Eating

The lapsed time between dishing-up and eating is, of course, not a constant applicable to all establishments. Moreover, it undoubtedly is not a constant

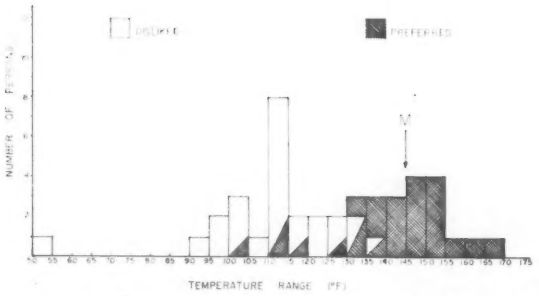


FIG. 2. *Temperature range of acceptability for entrées.*

in any given establishment. The type of operation, the layout of the establishment, and the freedom of the guest to determine the sequence of food pick-up are all recognizable reasons for the time to vary. However, the range of lapsed time will certainly fall within certain limits.

To learn something of these limits, the lapsed time was measured in a number of different eating establishments. Each was observed under conditions varying from the most slack period to and including the peak serving period. Observations were made in a table-service dining room, a straight-line cafeteria, and a hollow-square cafeteria.

These data are reported in Table 1. The lapsed time was considered to be that time between the dishing-up on the cafeteria line (or in the dining room kitchen) and the moment the guest began eating. It is believed that these limits embraced the intervals most likely to be encountered throughout most of the food service industry.

In the case of the table-service dining room, the size of the party being served appeared to have the greatest influence on lapsed time.

In the straight-line cafeteria, the hot food section was located between the salad and dessert stations and the guest had little choice in the sequence of food pick-up. The lapsed time was influenced primarily by the speed at which the line moved.

In the hollow-square cafeteria, the guest was free to determine the sequence of food pick-up. It was observed that a large majority selected their hot food (entrées) first and then the surrounding (cold) items, thereby increasing the lapsed time between dish-up and eating.

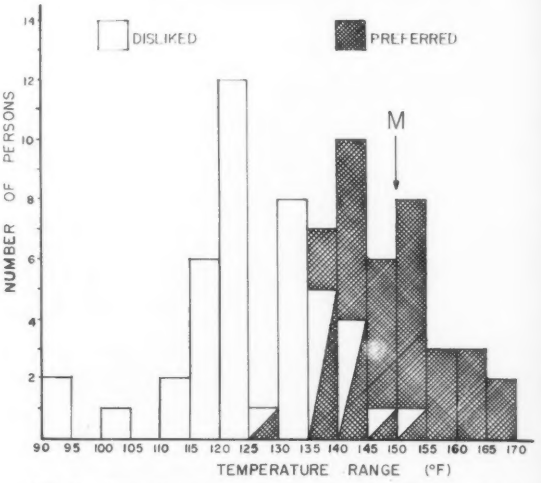


FIG. 3. *Temperature range of acceptability for beverages.*

Differences in dining room layout and provisions for guest comfort between the two cafeterias further explains the variation in lapsed time. Cloakroom facilities at the entrance of the straight-line cafeteria made it possible for the guest to remove his wraps before selecting his food. Similar facilities were not provided near the entrance of the hollow-square cafeteria. Consequently, the majority of guests removed their wraps in the dining room after selecting their food. This suggests that greater emphasis may need to be placed on planning more convenient "front-of-the-house" guest facilities to minimize lapsed time.

Laboratory tests were also made to determine the cooling rates for various food items. All foods were placed on prewarmed plates, in cups or bowls. A thermocouple connected to a recording thermometer was placed in the center of each food item. The data are reported in Figure 4 for soup, entrée, and a beverage.

Discussion

Knowing the preferred temperature ranges for eating foods, the rate at which served foods lose temperature, and the lapsed time between dishing up and eating, we can determine desirable holding temperatures.

Let us use tea as an example of a beverage.

TABLE 1 **Time intervals between dishing-up and eating food**

TYPE OF SERVICE	ELAPSED TIME		
	Minimum	Maximum	Median
Dining room	25 sec.	4 min. 30 sec.	55 sec.
Straight-line cafeteria	1 min. 5 sec.	2 min. 35 sec.	1 min. 40 sec.
Hollow-square cafeteria*	2 min.	5 min. 25 sec.	3 min. 10 sec.

*Includes time to remove wraps.

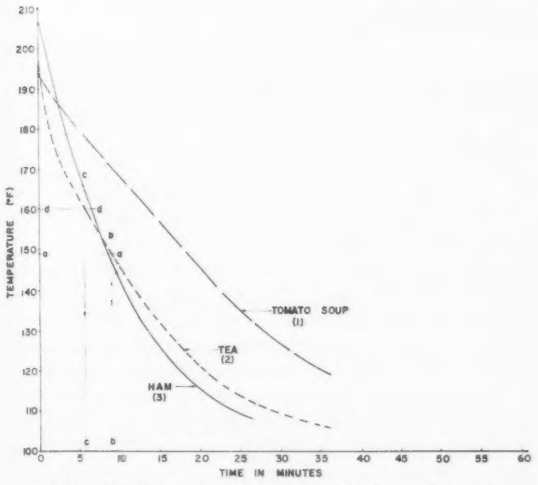


FIG. 4. *Cooling rates for soup, entrées, and beverages under serving conditions.*

From Figure 3, the preferred temperature is seen to be 149° F. Insert that figure in the temperature scale of Figure 4 and draw line (a-a) horizontally until it intersects Curve 2, the cooling rate curve for tea. At the point where Curve 2 is intersected by line (a-a), draw a vertical line (b-b) down to the horizontal (time) axis. Line (b-b) intersects the time axis at 9 min.

The median lapsed time for the hollow-square cafeteria was 3 min. 10 seconds. Substract this from 9 min. Set that time (5 min. 50 seconds) until it intersects Curve 2 (c-c). At this point, draw a horizontal line (d-d) towards the vertical (temperature) axis. The point of intersection is 160° F. Therefore, for these conditions, it is necessary to hold tea at 160° F., in order that it be at the preferred temperature when the guest begins to drink. Using the same procedure and typical lapsed time, the dishing-up temperatures for other food items can be determined, as follows:

Soup	156° F.
Ham	159° F.
Mashed potatoes	156° F.
Broccoli	159° F.

The lapsed time will, of course, vary in different establishments. The holding temperatures reported here are for a particular lapsed time. The same procedure, however, can be followed for any appropriate lapsed time and the proper steam-table holding temperature readily determined for any situation.

Conclusions

Individuals prefer to eat hot foods within a definable temperature range. The preferred temperature distribution within the range resembles a normal distribution curve, with the median temperature of the distribution curve representing the temperature preferred by the greatest number of people.

Lapsed time between dishing up and eating a food is not a constant applicable to all establishments. It will vary with the type of operation, the layout of the establishment, and the freedom of the guest to determine his sequence of picking up food.

Food should be held at a temperature higher than the preferred eating temperature. Holding temperature depends on: preferred eating temperature, rate of cooling of various foods, and the time between dishing up food and eating it. These three factors can be determined. Having once determined them, the desirable holding temperatures can be readily calculated for any given establishment.

Improvements in design of "front-of-house" guest facilities may help to reduce the lapsed time between dishing up and eating food.

Reference

(1) Study desirable food serving temperatures. Institutions 37: 101 (Nov.), 1955.

When You Use Yams

Fresh and canned yams are readily interchangeable in recipe development, according to the Louisiana Sweet Potato Commission, if you use these quantity relationships:

Fresh yams: 8 lb. No. 1 yams, AP, yield 24 to 26, 4-oz. servings of cooked, peeled yams.

Canned yams:

(a) Whole or cut style

(1) One No. 10 can has a drained weight of 72 to 74 oz., or about 18, 4-oz. servings.

(2) One No. 3 cylinder can has a drained weight of 33 to 36 oz., or about 8 to 9, 4-oz. servings. In most recipes, two No. 3 cylinder cans may be substituted for one No. 10 can with little or no adjustment in amounts of other ingredients or in number of servings.

(b) Mashed yams. One No. 10 can yields 112 oz., or 28, 4-oz. servings.

Lenna Frances Cooper

February 25, 1875—February 23, 1961

Lenna Frances Cooper had a long and distinguished career both in the practice of dietetics and in the education of younger persons who have faithfully followed her example. Perhaps no other member of The American Dietetic Association could have gone from this life on earth leaving behind so much warmth and gratitude in the hearts of those who knew her. Always desiring the best for her profession and ready to work without regard for hours, she willingly took time to listen to and counsel her associates.

What was the urge that stimulated Miss Cooper to rise from a start in an as yet unrecognized field and to reach the top at a fairly early age? Her parents were pioneer settlers in Kansas. God-fearing people, they were desirous that their children should receive an education that would enable them to serve others. One son went East to Battle Creek, Michigan, to study medicine, and in 1898, his sister, Lenna, followed him to take up nursing at the Battle Creek Sanitarium. She was graduated as a nurse in 1901 and for the next few years was closely associated with Dr. John Harvey Kellogg and assisted in the care of his many adopted and foster children. Dr. Kellogg practiced dietetics along with medicine and had many theories about food for "biologic" living. It can be imagined how his quiet nurse persuaded him to allow her to attend Drexel Institute in Philadelphia to study foods and food chemistry. She finished the two-year course in 1908 and later was awarded her bachelor's and master's degrees by Teachers College, Columbia University. Miss Cooper met all of her educational expenses with her own earnings.

On her return from Drexel, she became the *first* dietitian at the Battle Creek Sanitarium where later, as Dean, she initiated the Battle Creek Sanitarium School of Home Economics. The loyalty of the dietitians and instructors who served under her there is today unswerving as is that of the staff members and student interns who were with her in other institutions. Again, she was *first* when she was appointed a Supervising Dietitian in the Office of the Surgeon General of the United States Army during World War I. In this position she directed the work of over three hundred dietitians in war service for the first time in history. Another *first* was her suggestion that a conference of dietitians be arranged in 1917 to formulate a plan for dietetic communication and to consider the means by which dietitians could best serve the war needs, both at home and overseas. In cooperation with Lulu G. Graves, a decision was made to invite all dietitians of their acquaintance to come to Cleveland for October 18 to 20. This was of great importance to the dietetic profession, because here The American Dietetic Association was formed. From a nucleus of thirty-nine charter members, the Association today numbers almost 15,000. Miss Cooper was its first Vice-President and served as President in 1937-38. Her memory will be kept alive in the professional history and by word-of-mouth tributes from her friends.

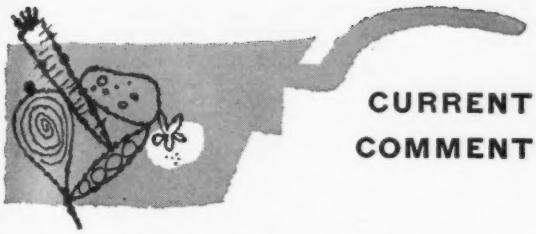
As an author, Miss Cooper wrote *How to Cut Food Costs* in 1917, and a few years later her book *The New Cookery* was published. Her third book, *Nutrition in Health and Disease* co-authored by Edith M. Barber and Helen S. Mitchell, is now, with Henderika J. Rynbergen as a fourth author, in its thirteenth edition and is a standard text for nurses and dietetic interns. Many of her papers have appeared in professional and scientific publications.

In 1927, Miss Cooper became Food Service Director at the University of Michigan and in 1930 went to Montefiore Hospital in New York City where she was Chief of Nutrition for eighteen years. During the years, she received many honors, including a degree of Master of Home Economics from Michigan State University and a Doctor of Science from Drexel Institute. In 1951, The American Dietetic Association conferred on her its highest honor, the Marjorie Hulsizer Copher Award.

The editorial in this JOURNAL, in recognizing her presidency states[1]: "Lenna Cooper has won the affection and respect of her many former students. These and her other associates attest to her real worth and her thoughtful consideration in human relationships. Blessed with patience and understanding, she has that rare administrative ability which inspires high standards through quiet suggestion rather than command."

The last few years of Miss Cooper's life were spent —still in service—making a home for her brother who preceded her in death by two years. During this time, she retained her professional interests and only last year attended the annual meetings of The American Dietetic Association and the Michigan Dietetic Association. She was a charter member of the Battle Creek Altrusa Club and one of the founders of a day nursery that continues to be a reminder of her thought for others. Hers was a life of service as her parents had envisioned and which she carried out to the fullest extent with unselfish devotion to her family, her friends, and her profession.—*Mary I. Barber, Battle Creek, Michigan.*

[1]The President. J. Am. Dietet. A. 13: 374, 1937.



CURRENT COMMENT

Paper and Plastic Containers in the School Lunch Service[1]

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PAPER CONTAINERS have been shown to be effective in controlling the size portions served, and in contributing to the attractiveness of food. They were also well accepted (1). Shankweiler, in a study at Robesonia, Pennsylvania, where from 650 to 900 meals are served each day, states (2) that the use of paper containers for food service in the school lunch program "saved labor" and effected greater ease of handling containers because of their reduced weight. Hampton has reported (3) that schools in Upper Darby, Pennsylvania, and New Brighton, Minnesota, which use paper containers at special dinners and banquets, reduced the serving time as well as that required for cleaning. Bryan has demonstrated (4) that the use of paper containers of various sizes decreased waste by permitting pupils to select food in the quantity which appealed to them in the school lunch program of Trotwood, Ohio. A firm of public accountants made a three-week study of three schools which served 693, 320, and 650 meals per day (5). Because of operating costs, labor costs, cost of space for storage of conventional ware, and breakage replacement costs, paper service was less expensive than conventional service in two of these schools, and only slightly more in the third school.

Problem and Procedure

This study was carried out to compare the effectiveness of regular plastic dishes with paper containers in school lunch food service in the following respects: through-the-line serving time; cleaning time; portion control; food waste; food consumption; acceptability of the containers by pupils, teachers, and school lunch workers; and cost. The third and sixth grades of the Seminole, Texas, public grade school were chosen as representative of two age groups requiring different amounts of food. These grades included 267 pupils—146 in grade three and 121 in grade six—who participated in the six-week study.

The assumption was that paper containers may provide a better method of portion control than the plastic dishes, and thus aid in inducing pupils to eat the amount served. Another assumption was that less time for serving and cleaning may be required, thus resulting in a saving of labor and equipment costs.

For the pupils in the third grade, plastic plates with three compartments were used on a brown plastic serving tray, along with other equipment. The pupils in the sixth grade were served on compartmentalized plastic trays with six compartments, one for silver, one for the milk container, and the others for other food. Even prior to this study, certain paper containers were being used for dessert. For the study of paper service, the brown plastic trays also were needed for carrying the paper containers and other equipment. In this study, plastic-coated paper plates of various colors and other paper containers for the different foods were used.

One set of menus was served the first week in regular plastic and the second week in paper containers, after which another set was served in the same sequence. A repeat study was made with paper service for only the third grade, because it offered greater opportunity for a more accurate account of cleaning time.

To determine the size of portions of food needed, the Recommended Dietary Allowances (6), the amounts required for "Type A School Lunches," and those given by Augustine and Hunter (7) were used. The amounts of food served were:

	3rd Grade	6th Grade
Protein food	1 oz.	2 oz.
Vegetable and fruit	⅜–½ cup	¾–1 cup
Milk	½ pt.	½ pt.
Bread	1 slice	2 slices

Serving and cleaning times, as well as amount of food served and plate waste per pupil per day, were calculated. The milk served and wasted was not included. The average amount of food consumed per pupil per day was determined.

The acceptability of paper containers in comparison with regular plastic containers was determined by analyzing the percentage of plate waste, the percentage of pupils eating in the lunchroom, and replies to "opinionnaires" given to pupils at the close of each week. The opinionnaires also were given to the thirteen teachers of the third and sixth grades and to twenty-one lunchroom workers.

The estimated cost of service with each type of container was determined by obtaining operating

[1]This is a report submitted in partial fulfillment of the requirements for a Master of Science degree by Ellen Webb Massengill. The paper containers were furnished through the courtesy of the Paper Cup and Container Institute and its affiliated companies. Received for publication November 19, 1959.

[2]Present address, Seminole, Texas.

TABLE 1 Comparison of average serving time with plastic dishes and paper containers

COMPARISON	SERVING TIME			
	3rd Grade		6th Grade	
	Range	Average	Range	Average
	First Menu			
	seconds/meal		*seconds/meal*	
Plastic	6.26–8.04	6.98	6.24–9.36	7.82
Paper				
1st week	6.75–9.43	7.70	6.96–8.08	7.61
2nd week	6.01–8.10	7.10	—	—
Average		7.40		
	Second Menu			
Plastic	5.28–7.04	6.24	7.31–8.95	7.82
Paper				
1st week	6.54–7.10	6.88	5.64–8.60	7.02
2nd week	6.00–8.50	7.20	—	—
Average		7.04		

costs of equipment and machinery, the cost of regular plastic container replacement or of paper container supplies, and labor costs. The estimated cost of equipment and machinery was obtained from a wholesale equipment company. Cost of paper was obtained from the Paper Cup and Container Institute, while labor costs were supplied by the business manager in the Seminole public schools.

Results and Discussion

In using regular plastic containers with both sets of menus, serving time per pupil varied from 5.28 to 9.36 seconds, whereas for paper containers it varied from 5.64 to 9.43 seconds (Table 1). The longest serving period was the one in which paper containers were used for the first time: this may have been partly due to the lunchroom workers' unfamiliarity with the use of paper containers. The average serving time for paper containers for both menus was 109 and 93 per cent of the time for regular plastic containers for the third and sixth grades, respectively. Serving time per pupil for both sets of menus was nearly the same.

With regular plastic containers, three workers were needed for cleaning, whereas only two workers were required when paper containers were used. Thus the cleaning time per pupil per day for regular plastic containers varied from 16.5 to 48.0 seconds, and for paper containers, varied from 9.8 to 32.0 seconds for the third grade (Table 2). These results are representative of the comparative cleaning times required for each grade. Average cleaning time for service with paper containers for the two grades combined was 60 per cent of the time required for service with regular plastic containers. Cleaning time for service with paper containers was 68 per cent for the first set of menus and 53 per cent for the second set of that required for regular plastic containers.

TABLE 2 Average cleaning time per pupil for plastic and paper containers

MENU	AVERAGE CLEANING TIME		
	Plastic	Paper	
		First study	Repeat study
	Third Grade		
	← *seconds/pupil/day* →		
I	21.0	13.4	14.3
II	22.6	13.2	11.7
	Sixth Grade		
I	31.8	26.4	—
II	38.4	23.6	—

The amounts of food served, wasted, and eaten by pupils are given in Table 3. Five per cent more food was served in regular plastic containers than in paper containers. Food consumed per day in regular plastic containers, exclusive of milk, varied from 0.44 to 0.66 lb. per third grade pupil, whereas in paper containers, it varied from 0.39 to 0.60 lb. For the sixth grade, the amount eaten daily ranged from 0.34 to 0.64 lb. per pupil with regular plastic containers and from 0.43 to 0.65 lb. with paper containers. The average amount of food eaten per pupil in the sixth grade was 0.064 lb. (6.3 per cent) more than that eaten in the third grade. When regular plastic containers were used, the average eaten per day per pupil was 2 per cent more.

Plate waste for regular plastic service varied from 16 to 48 per cent from day to day, whereas for paper service the figures were 9 to 46 per cent. For both grades, the average percentage of waste, as given in Table 3, for service with paper containers was 88 per cent of that for service with regular plastic containers. The percentage for the third grade was less than that for the sixth.

The average number of pupils who ate in the lunchroom when regular plastic containers were used was 4.5 per cent greater than when paper containers were used. This was due to over-all school attendance rather than to the type of food container used or the menus served.

Tabulation of the replies to the "opinionnaire" indicated that both pupils and teachers preferred the plastic ware. Lunchroom employees also liked to work with plastic dishes better, according to their replies.

The estimated cost of service with each type container is given in Table 4. The cost per pupil per day for service with regular plastic containers was 9 cents; that for service with paper containers was 8 cents. The savings that can be realized by using paper containers are partly due to the saving of labor since the containers are disposable. The greatest savings to be realized, however, would occur if kitchens were designed and built for this purpose

TABLE 3 Average amount of food served, wasted, and eaten per pupil

WEEKLY MENU	FOOD PER PUPIL					
	Plastic containers			Paper containers		
	Served	Consumed	Wasted	Served	Consumed	Wasted
	Third Grade					
	lb.	*lb.*	*%*	*lb.*	*lb.*	*%*
First menu						
1st week	0.76	0.53	30	0.74	0.51	31
2nd week	—	—		0.63	0.47	25
Second menu						
1st week	0.69	0.48	30	0.72	0.51	29
2nd week	—	—		0.65	0.15	23
	Sixth Grade*					
1st week	0.87	0.53	39	0.87	0.55	37
2nd week	0.83	0.53	36	0.80	0.50	37

*One menu only.

because less space and machinery would be required. Careful and extensive study would be required to save money when converting a kitchen for the use of paper containers.

Summary and Conclusions

A comparison was made of the effectiveness of food service in regular plastic dishes with that in paper containers in the school lunch program at Seminole, Texas. A daily average of 146 pupils in the third grade and 121 pupils in the sixth grade ate in the lunch room and participated in the study. Typical weekly school lunch menus were served in regular plastic containers and the following week in paper containers. Serving time, cleaning time, portion control, food waste, food consumption, and cost were compared.

The type of container had little influence on the serving time, on the portions served, or on the amount eaten. Percentage waste was 12 per cent less with paper containers. Cleaning time was 40 per cent less. This saving is attributed to a reduction in labor time required. The teachers and school lunch workers preferred the plastic dishes to which they were accustomed; nevertheless, a selective use of paper containers would be acceptable to them. The cost per pupil was slightly less for paper containers, because of the saving in cost of labor.

TABLE 4 Estimated costs per pupil per day for equipment and labor for food service with plastic dishes and paper containers

ITEM OF EXPENSE	PLASTIC DISHES	PAPER CONTAINERS
Equipment*	$0.00337	$0.00337†
Plastic dishes	.00075	—
Paper containers	—	.02116
Labor	.08944	0.05721
Total	$0.09281	$0.08174

*Includes dishwasher, maintenance, utilities, water heater, and scullery counter.

†Some dishwashing equipment is necessary for cutlery and trays for carrying paper articles. The saving in equipment costs involved, however, is difficult to estimate.

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A Planned "Disaster" as Training for Emergencies in the Dietetic Service

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WHAT WOULD we do in the event of a disaster? How could we feed 2400 patients in a neuropsychiatric hospital? Luckily, these questions have never been truly put to the test at the Northport Veterans Administration Hospital. However, we were able to derive some slight insight into the handling of such a situation by having to cope with a planned "accident."

Three weeks before the incident occurred, more time than a sneak attack from an enemy or violent act of nature would allow, we received news which required ingenious planning. We were told that there would be no steam for, possibly, an entire day. The problem seemed mountainous.

The Engineering Department needed to shut

[1]The authors wish to express their appreciation to Florence M. Ralli, Chief of the Dietetic Service, for her leadership in planning this training function; to Irving J. Blumenthal, M.D., for his editorial assistance; and to Herman Riesel, Food Service Supervisor, for his reporting on patient reactions to the emergency service.

the steam down to check the boilers and chimney after they had cooled. To the Dietetic Service, this posed some very interesting questions. How could we cook at least some of the items on the menu? And, even if we could manage this task, what would we do about sanitation? The situation was surveyed to see what had to be done.

Various dietitians planned menus for consideration, and their ideas were presented at a general meeting the following week. The menu was considered in terms of cost of additional paper goods, minimal use of steam available in the pipes for sanitation, and, the labor needed.

The menu, as it was finally selected, made use of some short cuts. For all three meals, it was planned that the patients would carry their food on trays.

Breakfast

Whole orange
Dry cereal, to be eaten from the package
2 cold, hard-cooked eggs, cooked the night before
Toast (because patients expected it) served with the eggs on 6-in. paper plates
Butter
Jelly packet
Coffee (a necessity) served in a paper cup
Milk in a ½-pt. carton
Tableware—one spoon

Noon Meal

Paper plate had on it:

Chilled salmon
Fresh lemon wedge
Potato salad on lettuce leaf
4 tomato wedges
Bread and butter sandwich (to avoid use of a knife)
Milk in a ½-pt. carton
Fresh pear
Cupcake
Tableware—one fork

For the evening meal, it was decided to use a cold meal, similar to that served at noon, but with vegetables cooked and heated in the electric oven.

The service of both breakfast and the mid-day meal was conducted without undue hardship and with a minimum of confusion. There were few complaints from the patients and the majority commented that they liked the change. The service of dry cereal eaten out of the individual package presented no problem. Since there were fewer articles to be washed in the dish machine, soiled items from breakfast were sent to one centralized area for cleaning. We discovered that all units had an ample supply of hot water and steam until service was restored at 12 noon, this being earlier than anticipated. The menu and service was retained as planned so that we might gain some experience in running a "near-disaster" operation.

What We Learned

Advantage was taken of the reduced workload due to the simplified menu, and numerous special cleaning tasks were accomplished. It should further be noted that most of the items for modified diets, wherever possible, were based on the regular menu or were of a similar nature.

What did we discover in retrospect? A real disaster would not, of course, give us any advance notice for planning. With this in mind, we decided to have available at our hospital various types of paper goods sufficient for service for three meals (one day). Advance planning of a menu will not be done, as we would need to make the menu lend itself to the situation. It was our feeling that a planned menu is not feasible, since knowledge of physical damage in relation to preparation would be necessary. Menus should be based on existing food stores, labor, equipment available, and the duration of the disaster situation.

These factors should be evaluated before a disaster occurs. That an unforeseen situation of near catastrophic nature may arise is exemplified by an occurrence at St. Luke's Hospital in New York City, as reported by Meehan (1). A power failure in a portion of the city curtailed operations for over 12 hr. at that hospital. Fortunately, a neighboring hospital and various city agencies came to the aid of the hospital. Had some planning been done, St. Luke's would have had some operational procedures with which to function. Instead, each problem — and there were many — was dealt with on a stopgap basis as it arose. Another major consideration: What if help were not available? Additional information in this area is available (2, 3), but plans must be tailored to the specfic needs of the hospital and the conditions existing at the time when any problems are considered.

In conclusion, it cannot be reiterated too strongly, that *thinking the problem through while time is available* will prevent panic and aid in making rapid, reasonable decisions if and when the need should occur.

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Today, one hour of farm labor produces four times as much food and other crops as it did in 1919-21. But, productivity will have to increase even more to take care of the predicted 1975 population of 230 million. To feed such a population will require: 16.3 billion lb. more red meat; 47 billion lb. more milk; 20.7 million tons more fruits and vegetables; and 20 billion more eggs!

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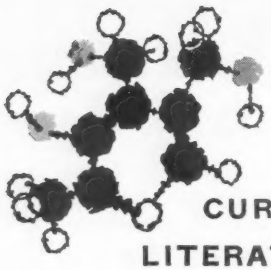

CURRENT LITERATURE

Contributed by: Janette C. Carlsen, The Johns Hopkins Hospital, Baltimore; Frank E. Rice, Ph.D., Consultant in Nutrition Research, Chicago; Clara Karl Frederick, Lombard, Illinois; Margene A. Wagstaff, Elmhurst, Illinois; the following dietetic interns at the Veterans Administration Center, Los Angeles: Margaret E. Dorsey, Connie Eckman, Mary Flick, Carolyn Henricks, and Rochelle Howard; and the dietetic interns of Charity Hospital of Louisiana, New Orleans.

THE AMERICAN JOURNAL OF CLINICAL NUTRITION

Vol. 9, January-February, 1961

*Studies of patients with hyperglyceridemia. L. W. Kinsell, G. D. Michaels, G. Walker, S. Splitter, and R. E. Visintine.—p. 1.

*Fatty acid distributions in serum lipids and serum lipoproteins. F. T. Lindgren, A. V. Nichols, and R. D. Wills.—p. 13.

*Studies on the characterization of human serum lipoproteins separated by ultracentrifugation in a density gradient. D. G. Cornwell, F. A. Kruger, G. J. Hamwi, and J. B. Brown.

I. Serum lipoproteins in normal, hyperthyroid and hypercholesterolemic subjects. —p. 24.

II. Serum lipoproteins in hyperlipemic subjects.—p. 41.

*The serum lipids and lipoproteins in normal and hyperlipidemic subjects as determined by preparative ultracentrifugation. Effects of dietary and therapeutic measures. Changes induced by *in vitro* exposure of serum to sonic forces. R. H. Furman, R. P. Howard, K. Lakshmi, and L. N. Norcia.—p. 73.

Hyperglyceridemia. Four persons with hyperglyceridemia were studied and, contrary to most of the published material, these data indicate that more than one syndrome exists. Some syndromes appear to be associated with primary difficulty in metabolizing chylomicronous glyceride, others with difficulties relating to metabolism of one or more of the glyceride-carrying lipoproteins of greater density than chylomicron. Lipostat disease appears to be a significant part of some of these syndromes. Better understanding of the gross abnormalities associated with hyperglyceridemias should contribute to better understanding of lesser degrees of hyperlipidemia associated with atherosclerosis and other diseases.

Fatty Acid Distribution. This study was an effort to provide a more complete fatty acid analysis of each fatty acid-containing chemical fraction isolated both from whole serum and from each of the major serum lipoprotein fractions. Analyses were made using gas-liquid chromatography. For a given serum sample, the fatty acid composition of each of the major lipid classes (cholesteryl esters, glycerides, and phospholipids) are broadly similar with each of three major lipoprotein fractions with possibly one exception. Fatty acid distribution of the cholesteryl ester moiety of the 3_f^0 20–10^5 class appears to contain more oleic and palmitic acid and less linoleic acid relative to cholesteryl ester fractions of the other two major lipoprotein classes.

Serum Lipoproteins. The serum lipoproteins of normal subjects were separated by centrifugation in a density gradient and characterized by their cholesterol, phospholipid, and fatty ester content. Purification (of the S_f 3–9 lipoprotein fraction) and subfractionation (of S_f 10–400 lipoproteins) are necessary for the characterization of serum lipoprotein distributions. The serum lipoproteins of euthyroid hypercholesteremic, hypothyroid, and hyperthyroid subjects were then isolated and compared with the serum lipoproteins of normal subjects. Hyperthyroid subjects exhibited moderate hypocholesteremia, significantly lowered S_f 3–9 lipoprotein fraction, and a moderately lowered high density lipoprotein fraction. Hypercholesteremic subjects, whether hypo-, eu-, or hyperthyroid, all had the same abnormal lipoprotein pattern characterized by: elevated serum cholesterol, phospholipid, and fatty acid esters: an elevated cholesterol: phospholipid ratio, and a normal fatty acid ester:cholesterol ratio. The S_f 3–9 lipoprotein fraction had a normal composition but was significantly elevated in concentration. In hypothyroid subjects, hypercholesteremia can be corrected by thyroid hormones, but not in euthyroid subjects.

Serum Lipoproteins in Hyperlipemic Subjects. Using the same methods described in the previous article, sixteen hyperlipemic subjects were studied. Hyperlipemia is characterized by elevated chylomicron and S_f 10–400 and lowered S_f 3–9 and high density lipoprotein fractions. Hyperlipemia was corrected in one subject with diabetic acidosis by insulin, and in two patients with idiopathic hyperlipemia and associated diabetes mellitus by linoleate. The sequences in serum lipoprotein metabolism are discussed with reference to over- and under-production. The chylomicron fraction is defined, and the contribution of alimentary chylomicrons and endogenous lipoproteins to hyperlipemia is considered.

Serum Lipids and Lipoproteins. The serum lipids (total and free cholesterol, phospholipids, free fatty acids, and triglycerides) and lipoproteins were studied in normal subjects and in patients with a variety of hyperlipidemic disorders. Data are presented on the relationship between degree of esterification of cholesterol and lipoprotein density, the influence of unsaturated fat feeding (corn oil diet), and various therapeutic measures on lipoprotein distribution in certain hyperlipidemic disorders. A preliminary evaluation is made of the effects on lipoproteins of the *in vitro* exposure of serum to sonic oscillation (a potentially useful new tool in serum lipid study).

THE AMERICAN JOURNAL OF NURSING

Vol. 61, February, 1961

*When the bell rings at noon. J. C. Obert. —p. 89.

The Nurse and School Lunch. The school lunch plan and its administration are explained. In many cases, it is the duty of the school nurse to help coordinate nutrition education. Her function is to stimulate the interest of pupils and teachers at each level, to supply or suggest materials, to identify problems, and to locate and utilize resources. In this connection, the functions of the nutritionist as resource person for the nurse are pointed out. Projects which nurses have found successful include a school health council, a nutrition institute (resulting when children ate no breakfast and came to school with no provision for lunch), determination of food acceptability, preparation of foreign foods related to social studies, and pupil employment as an experience in sanitation education.

THE AMERICAN JOURNAL OF SURGERY

Vol. 101, February, 1961

*Control of gastric function after subtotal gastrectomy. J. M. Beardsley.—p. 219.

Controlling the Emptying Time of the Stomach. A new modification of the Billroth II operation for subtotal gastrectomy has been used to control the emptying time of the stomach and the proper utilization of buffers in 135 patients. The results justify the original premise that success depends on the construction of a normal functioning gastric pouch and a more complete utilization of the buffers which can only be achieved through careful attention to certain technical details. A standard sandwich containing 30 gm. carbohydrate, 28 gm. fat, and 12 gm. protein, a total of 420 calories, was given with a small amount of barium to explain variations in end results that occur after surgery. Results showed the absence of complications in the post-operative period. Forty-nine operations have been performed since this study was completed.

BRITISH MEDICAL JOURNAL

No. 5220, January 21, 1961

*Ulcerative colitis provoked by milk. S. C. Truelove.—p. 154.

No. 5221, January 28, 1961

*Oral treatment of pernicious anemia: Further studies. F. S. Mooney and J. G. Heathcote.—p. 232.

*Pernicious anemia in Jamaica. K. L. Stuart and J. E. MacIver.—p. 236.

No. 5222, February 4, 1961

*Serum proteins and hepatic function in pregnancy with anaemia in Nigerian women. J. C. Edozien, C. Adeniyi-Jones, E. J. Watsen-Williams.—p. 333.

Ulcerative Colitis Provoked by Milk. In a group of patients with ulcerative colitis, removal of milk and protein containing milk products from the diet has resulted in marked improvement in the clinical course of the illness. In five of these patients, milk has been re-introduced into the diet, and on every occasion this has been followed in a few days or weeks by a frank attack of ulcerative colitis. One patient was tested twice on separate occasions, so that there were six such events in all. There was a highly significant positive correlation between the time a patient was symptom free while on a milk-free diet and the time required for clinical relapse after re-introduction of milk. This finding is compatible with the theory that these relapses represent an immunologic type of response to milk proteins with the reactivity of the colonic mucosa varying according to the length of time since it was last exposed to the allergen.

Treating Pernicious Anemia. In previous clinical studies, a vitamin B_{12}-peptide complex derived from *Streptomyces griseus* (H.P.P./1) was used to treat patients with pernicious anemia. These studies have been extended to include cases treated with batches of a vitamin B_{12}-peptide derived from fermentations of a species of *Propionibacterium*. Ten patients receiving H.P.P./1 have been maintained for an average period of 1026 days on an average daily dose equivalent to 8.6 mcg. vitamin B_{12}. Eleven patients receiving the propionibacterium-peptide complex have been maintained for an average period of 849 days on an average daily dose equivalent to 19.7 mcg. vitamin B_{12}. The superiority of the propionibacterium complex over crystalline vitamin B_{12} in the oral treatment of pernicious anemia has been demonstrated in a controlled experiment, and daily doses of 300 mcg. vitamin B_{12} equivalent have given a maximum response in two other patients. No refractoriness or neurologic complication has developed, and all patients remain in complete clinical remission.

Pernicious Anemia in Jamaica. Clinical and laboratory details are given on ten Negro patients with pernicious anemia treated during a thirty-month period. All showed the usual clinical and laboratory features of pernicious anemia; and in the patients on whom these tests were carried out, the Schilling test and gastric biopsy findings were characteristic. Anorexia and loss of weight were conspicuous. It is thought that the rarity of this disease in the Negro has been overemphasized and that hospital statistics may be misleading in this respect. The literature on pernicious anemia in other parts of the tropics is briefly reviewed. There is evidence that, in addition to the basic gastric lesion, dietary and economic factors may play a part in the genesis of the disease.

Serum Proteins and Hepatic Function in Pregnancy. The serum proteins and liver function of non-pregnant Nigerian women and of pregnant women, with or without anemia, have been investigated. Dietary deficiency of protein and hepatic damage were not important etiologic factors in the anemias of pregnancy. The majority of anemic pregnant women had megaloblastic erythropoieses. Their response to treatment with antimalarial agents, iron, and folic acid was satisfactory.

THE CANADIAN MEDICAL ASSOCIATION JOURNAL

Vol. 84, January 28, 1961

*Further outbreaks of botulism in Canada. C. E. Dolman.—p. 191.

Botulism in Canada. In the past six years, ten outbreaks of botulism have occurred in Canada, involving twenty-four persons, of whom fifteen died. In all instances, uncooked products of fish and marine mammals were the vehicles. Coastal Indians in British Columbia were affected in three instances, while on six occasions (five of them in the summer of 1960), the victims were Labrador Eskimos. The tenth episode involved a woman in Penticton, B. C., who recovered from type E botulism due to salted herring imported from Holland; this case has been described in detail. Over a forty-year period, twenty-four outbreaks of botulism have been recorded in Canada, affecting eighty-seven persons, with fifty deaths, i.e., a case fatality rate of 57.5 per cent. The implicated foods in two-thirds of these occurrences have been fish and marine mammals. The coastal regions of British Columbia and Labrador have been the setting for a great majority of all outbreaks. *Cl. botulinum* has been isolated by one laboratory from remnant or companion foods in twelve instances. The strains were identified as four type A, one type B, and seven type E. Comparisons are made between the type distribution, the kinds of foods concerned, and the case fatality rates in Canada and several other countries.

DAIRY SCIENCE ABSTRACTS

Vol. 23, January, 1961

*Fallout and man's diet. E. R. Mercer and F. B. Ellis.—p. 1.

Strontium-90 and Calcium in the United Kingdom. Strontium-90 in individual foods that make up the human diet in the United Kingdom was determined and reported in terms of micromicrocuries intake per day. "Milk and cream" was highest: in 1958, 3.47; in 1959, 4.86. Calcium intake during these years from "milk and cream" was calculated to average 498 mg. per day, also the highest of any of the foods. The "discrimination" against strontium relative to calcium in the food chain is discussed. A useful table is presented giving data on twenty-six of the principal nuclides formed in fission—their half-life, types of radiation emitted, fission yields, and so on. Reasons why strontium-90 is of particular biologic significance are presented.

FOOD TECHNOLOGY

Vol. 15, February, 1961

*Microbiological standards for foods. M. Ingram.—p. 4.

*Effect of alternate freezing and thawing on the ascorbic acid content of frozen vegetables. G. J. Hucker and A. Clarke.—p. 50.

*Storage changes in frozen fish: A comparison of objective and subjective tests. K. Andersson and C. E. Danielson.—p. 55.

*Relation of marbling, cooking yield, and eating quality of pork chops to backfat thickness on hog carcasses. M. O. Murphy and A. F. Carlin.—p. 57.

*The water binding capacity of fresh pork. II. The influence of phosphates on fat distribution in meat products. P. Sherman.—p. 87.

*The water binding capacity of fresh pork. III. The influence of cooking temperature on the water binding capacity of lean pork. P. Sherman.—p. 90.

Microbiologic Standards for Foods. In operating a bacteriologic standard, one chooses a number as standard and compares with it an experimentally observed number. Ways of choosing the standard number are discussed. The statistical uncertainty of the experimental observations is emphasized, and its dependence on the sampling method and examination technique is discussed. It is desirable to establish an objective numerical basis for any standard; to determine the variability of the number recorded by the standard method of examination; and to base the specification on statistical tests which take account of that variability.

Ascorbic Acid in Frozen Vegetables. Destruction of ascorbic acid occurs during alternate freezing and thawing of frozen peas, Lima beans, corn, and green beans. A study of 176 samples indicated that the thawing time may be as important as thawing temperature. The most significant factor in ascorbic acid loss when vegetables are alternately frozen and thawed is the time and temperature of holding during the thawed phase. Vegetables may be held from 4 to 8 hr. after blanching and before freezing without an appreciable loss in ascorbic acid.

Storage Changes in Frozen Fish. Experiments were designed to determine the correlation between chemical methods for measuring rancidity in frozen fish and organoleptic evaluation by experienced tasters. The changes ascertained by the chemical method exhibited good agreement with the changes in taste. It was also shown that the samples of herring treated with ascorbic acid remained palatable for eleven months, whereas the untreated samples became rancid after two months' storage.

Backfat Thickness and Pork Chop Quality. Quality factors of interest

to consumers were determined on rib and loin chops from hogs that varied in backfat thickness. Degree of marbling increased slightly as the backfat increased. Drip losses from pork chops increased and volatile losses decreased as the backfat increased. Amount of backfat on the carcass did not have a significant effect on the tenderness, juciness, or flavor of braised pork chops. Marbling in the raw *longissimus dorsi* muscle at the tenth rib or the fourth lumbar vertebra shows more promise as a means of predicting tenderness and juciness of braised ½-in. rib and loin chops than thickness of backfat.

Influence of Phosphates on Fat in Meats. It has been shown that the ability of phosphates to emulsify fats depends on the free fatty acid content of the fat and the alkalinity of the phosphate employed. Emulsification of fat in sausages occurs only when an adequate amount of soap is present to act as the emulsifying agent. Soap formation is promoted when the added phosphate is very alkaline, and the fat contains a high proportion of free fatty acid. The free fatty acid content of edible fats employed in sausage production is extremely low. Hence, soap formation will be at too low a level for the fat to be emulsified.

Heat and the Water-Binding Capacity of Fresh Pork. When ground pork is heated at 25° to 100°C., after mixing with solutions of alkaline phosphate or sodium chloride, the fluid retained shows an over-all decrease with increasing temperature. For additive concentrations not exceeding 2 per cent, fluid retention falls initially and then rises to a maximum at approximately 50°C. At still higher temperatures, fluid retention falls off rapidly. With higher additive concentrations, the pattern is different, since all added fluid is absorbed by the meat before heating. The additive employed determines the temperature at which fluid release begins; it then continues smoothly with increasing temperature.

GASTROENTEROLOGY

Vol. 40, February, 1961

*Fat absorption and the esterification of fatty acids by intestinal mucosa. K. J. Isselbacker.—p. 259.

Intestinal Mucosa in Fat Metabolism. In the normal process of fat absorption, hydrolysis of fat occurs mainly within the lumen of the intestines. It was previously assumed that the esterification of long-chain fatty acids to triglycerides, catalyzed by the action of mucosal lipase, was a reversal of triglyceride hydrolysis. Recent studies indicate that resynthesis and esterification is an energy-dependent process and involves certain cofactors. The cofactors involved are adenosine triphosphate, coenzyme A, and magnesium ions. Recent experiments indicate that the first step in esterification is the enzymatic "activation" of the long-chain fatty acids to coenzyme A derivatives. The final steps involved in intestinal lipid synthesis are yet to be proved.

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 175, February 18, 1961

*Carbohydrate metabolism in arteriosclerotic patients. Foreign Mail-Germany.—p. 626.

Vol. 175, March 4, 1961

*Renal changes in kwashiorkor. Foreign Mail-India.—p. 169.

Carbohydrate Metabolism in Arteriosclerotic Patients. In 119 patients with coronary sclerosis and 38 with arteriosclerosis, the glucose tolerance test gave an abnormal curve in 56.3 per cent of the patients and in only 9.6 per cent of the controls. In 35 of the arteriosclerotic patients, glycosuria was detected during the test. Latent disturbance of carbohydrate metabolism was most frequent in patients with coronary infarction (73 per cent). Glucose tolerance was decreased in 40 per cent of those with peripheral vascular sclerosis and 39 per cent of those with cerebral sclerosis. Deviations of carbohydrate metabolism were less frequent than hyperlipemia. Disturbance of carbohydrate metabolism appears to be a characteristic of certain constitutional types and age groups rather than a direct accompaniment of arteriosclerosis.

Renal Changes in Kwashiorkor. Following death, autopsies showed extensive fatty degeneration of the liver in eight of ten kwashiorkor patients. The kidney in all cases showed pathologic changes involving the Bowman's capsule, the glomerulus, and the tubules. Lesions in the kidney resemble those of patients with certain hepatic disorders or ulcerative colitis. There was a history of diarrhea in all ten patients. Renal changes in these cases of kwashiorkor may have been related to the associated hepatic and intestinal diseases or to the increased excretion of amino acids.

THE JOURNAL OF LABORATORY AND CLINICAL MEDICINE

Vol. 57, February, 1961

*Absorption of Co^{60}—labeled vitamin B_{12} in man and uptake by parasites, including *Diphyllobothrium latum*. H. H. Scudamore, J. H. Thompson, Jr., and C. A. Owen, Jr.—p. 240.

Vitamin B_{12} Absorption by Man and Parasites. Research was undertaken to determine whether certain parasitic infections alter vitamin B_{12} absorption in man and whether any significant amount of the vitamin was taken up by the parasites. Thirty-two nonanemic patients harboring one or more parasites were given labeled vitamin B_{12} and their urinary excretion was measured by a modified Schilling method. A normal urinary excretion was found in all patients except those suffering from *Diphyllobothrium latum*. It was therefore concluded that parasitic invasion will not produce anemia.

JOURNAL OF THE NEW ZEALAND DIETETIC ASSOCIATION

Vol. 14, December, 1960

*A physician inspects the hospital diet. D. F. Malcolm.—p. 1.

*Food faddism and quackery. F. Davidson.—p. 13.

The Hospital Diet. The present-day hospital diet in New Zealand reflects adequate dietary standards. Timing of meals is out of line, however, when compared with the pattern in the community. The light evening meal may be the cause of sleepless nights, a common complaint among patients; a dinner meal with higher fat content might relieve this. Maternity patients are apparently rushed with their meals, since the hospital meal schedule conflicts with baby feeding schedules. Children have difficulty managing their trays on their knees in bed. All these factors involve cooperation with other departments and should be solved with the welfare of the patient in mind.

Food Faddism. Examples are given of food fallacies and the beliefs that make them possible, prevalent in New Zealand today. Among the most common and widespread beliefs are these: (a) Our food is over-processed and over-refined, thus incapable of supplying the nutrients we need. (b) "Natural" foods (such as honey) supply minerals which have been lost in the processing. (c) Anyone who is "run down" needs a tonic (vitamins). (d) Only foods grown on compost contain all the elements necessary for health. (e) Certain foods are wonder foods (endowed with properties bearing little or no relationship to their actual value in the diet), including apple-cider vinegar, honey, cod-liver oil, comfrey, kelp, and wheat-germ oil. Each of these beliefs is discussed in terms of nutrition facts.

THE JOURNAL OF NUTRITION

Vol. 73, February, 1961

*Utilization of amino acids from foods by the rat. 5. Effects of heat treatment on lysine in meat. B. S. Heller, M. R. Chutkow, C. H. Lushbough, A. J. Siedler, and B. S. Schweigert.—p. 113.

*Sex differences in effect of restriction of time of access to food on the plasma lipid components in rats. E. W. Lis and R. Okey.—p. 117.

*Energy requirements of men in extreme heat. C. F. Consolazio, R. Shapiro, J. E. Masterson, and P. S. L. McKinzie.—p. 126.

*Influence of heat on the digestibility of meat proteins. L. J. Schroeder, M. Iacobellis, and A. H. Smith.—p. 143.

Mineral deficiencies of milk and congenital malformations in the rat. B. L. O'Dell, B. C. Hardwick, and G. Reynolds.—p. 151.

*Efficiency of tryptophan as a niacin precursor in man. G. A. Goldsmith, O. N. Miller, and W. G. Unglaub.—p. 172.

*Amino acid requirements of children: Isoleucine and leucine. I. Nakagawa, T. Takahashi, and T. Suzuki.—p. 186.

*Response of cereal-fed guinea pigs to dietary broccoli supplementation and X-irradiation. D. H. Calloway and A. H. Munson.—p. 191.

Lysine from Heat-Processed Meats. The effects of a variety of heat-processing methods on the lysine content of meat protein and its subsequent availability for growth of the rat were investigated. Lysine, as determined microbiologically, was not af-

fected markedly by any of the heat treatments used. Standard cooking procedures did not appreciably affect the utilization of lysine from muscle protein. Severe heat treatment (autoclaving) substantially reduced the amount of available lysine in these products.

Time-Limited Feeding and Plasma Lipids. Cholesterol feeding resulted, in rats of both sexes, in significant lowering of the percentage of arachidonic acid in the plasma cholesterol ester. The change was greatest in the female with high cholesterol values and restricted access to food. When dietary linoleic acid was available, it replaced arachidonic acid in the cholesterol ester. The data suggest that rate of esterification of excess dietary cholesterol may differ in males and females and that time restriction of access to food may delay removal of cholesterol ester from plasma to a greater extent in females than in males.

Energy Requirements in Extreme Heat. Data from this study suggest that there is an increased caloric requirement for men working and living in extreme heat. Significant increases were observed in food consumption, and the actual caloric requirements were even greater because of changes in the body composition of the men. These increased requirements are probably due to the increased heat load imposed on the body by solar radiation and extreme heat. The increased requirements are, in all likelihood, a combination of increased action of the blood in heat transport, increased action of the sweat glands, plus the increased total metabolic rate due to the elevation in body temperature.

Heat and Meat Proteins. This comparative study was carried out on several kinds of meat, with particular attention to the influence of carbohydrate, water, and *p*H value on the effect of heat on the *in vitro* digestibility of the meat proteins. Digestibility decreased with increasing carbohydrate concentration on dry-autoclaving. When reconstituted, such decreases were largely eliminated and the proteins showed increased susceptibility to proteolysis. Increasing *p*H levels fostered some interaction between carbohydrates and proteins as evidenced by decreased liberation of amino nitrogen.

Tryptophan as a Niacin Precursor. Experiments were conducted with adult subjects to determine the efficiency of conversion of tryptophan to niacin in man. The conversion ratio was calculated by comparing excretion of niacin metabolites after administration of niacinamide with excretion after administration of tryptophan. An average of 3.3 per cent of the tryptophan was converted to niacin or, expressed in another way, 55.8 mg. tryptophan was equivalent to 1 mg. niacin. The conversion ratio varied considerably among individual subjects; from 34 to 86 mg. tryptophan was found to be equivalent to 1 mg. niacin.

Isoleucine and Leucine Needs. The minimal requirements of isoleucine and leucine were determined for six boys of school age by the use of the nitrogen balance method. From the results obtained, it was estimated that children eleven years old require 1.0 gm. isoleucine and 1.5 gm. leucine as the daily minimal needs, or 30 and 45 mg. per kilogram body weight, respectively. The children excreted a larger amount of creatine after receiving the amino acid mixture, as compared with that after consuming normal diets.

Broccoli Supplementation and X-Irradiation. Provision of broccoli as a supplement in rat diets resulted in improved nutriture, larger livers with higher stores of vitamin A and minimal fatty changes, and superior gonadal development. Following irradiation, decrements in body weight and food intake as well as the characteristic events of the radiation syndrome were seen in both normal and experimental animals. Broccoli supplementation of the cereal diet generally reduced the degree of distortion or delayed its appearance. An attractive hypothesis for the greater radiosensitivity of the unsupplemented group lies simply in nutritional deficiency.

THE JOURNAL OF PEDIATRICS

Vol. 58, February, 1961

*The effect of high caloric feeding on the growth of premature infants. S. E. Snyderman and L. E. Holt, Jr.—p. 237.

*Favism in a nursing infant. B. Emanuel and A. Schoenfeld.—p. 263.

Feeding the Premature Infant. A high caloric feeding in the form of a concentrated humanized type of prepared infant formula was given to ten premature infants. It resulted in an increased rate of weight gain. However, linear growth, as measured by the increase in rate of growth of the fibula, was not affected. This feeding contained 1.3 calories per milliliter. The controls were premature infants who were in the nursery at the same time and whose care was exactly the same except for the feeding which was less concentrated (1 ml. provided 0.9 calorie). It was not possible to feed any of the infants in the study group double the usual caloric intake because of their refusal to take an equivalent volume of the double-strength formula. It appears that the weight gain is due to fat accumulation. The advantage of accelerating weight gain and thereby shortening the hospital stay of premature infants is open to some question. This may result in the discharge of physiologically immature infants who should simply weigh more.

Favism in a Nursing Infant. A case of favism in a breast-fed infant of Mediterranean parents is described. Glutathione levels and glutathione instability were found to be abnormal during the recovery period. The reactive substance in fava beans which induces hemolytic anemia in glucose-6-phosphate-deficient individuals was transmitted through the mother's milk. Jaundiced breast-fed children from parents of Mediterranean countries should be watched for favism.

THE LANCET

No. 7170, January 28, 1961

*Skeletal fluorosis and its neurological complications. A. Singh, S. S. Jolly, and B. C. Bansal.—p. 197.

Skeletal Fluorosis and Complications. Of forty-six cases of skeletal fluorosis in Punjab, India, twenty-one had compression paraplegia. All the patients lived in a small area where drinking water and soil had an extremely high (though variable) content of fluoride. The intoxication chiefly affected the skeleton, producing typical radiologic features of diagnostic value. The teeth also showed characteristic mottling in many cases. The paraplegia was caused by compression of the spinal cord produced by excessive deposition of fluorides in the vertebral column and resultant narrowing of the spinal canal. It did not differ significantly from other compression paraplegias. Significantly high levels of fluoride were found in the blood, urine, and bones of these patients, and there was a characteristic histologic pattern of skeletal fluorosis.

NEW ENGLAND JOURNAL OF MEDICINE

Vol. 264, February 16, 1961

*Physiologic mechanisms in potassium deficiency. A. Leaf and R. F. Santos.—p. 335.

Vol. 264, February 23, 1961

*The effect of maternal ingestion of iophenoxic acid on the serum protein-bound iodine of the progeny. R. Shapiro.—p. 378.

Potassium Deficiency. The following general clinical states are those most commonly associated with potassium depletion and are considered separately: alkalosis; acidosis; abnormal gastrointestinal losses; excessive adrenal corticosteroids; and diuretic therapy. Potassium has long been known to be quantitatively the major cation within animal cells. The ability to accumulate potassium and extrude sodium in the presence of large amounts of sodium and small amounts of potassium in the surrounding fluid is a fundamental characteristic of living cells. With the death of the cell, these ionic gradients are rapidly dissipated. It has been demonstrated that these gradients are maintained by living cells in spite of readily measurable permeabilities of cell membranes to both ions. This ionic distribution is the result of steady-state conditions maintained at the expense of energy from cellular metabolism and is not simply an equilibrium state resulting from absolute impermeabilities of the cell membranes to one or more ions. The wary internist and surgeon will be constantly on the lookout for potassium deficiency and agile and

persistent in its prevention and treatment.

Effect of Iophenoxic Acid. A study of fifty-one mothers and their sixty-three children clearly demonstrates the ability of iophenoxic acid to cross the placental barrier many years after ingestion by the mother. Persistently elevated concentrations of protein-bound iodine were found in all the mothers and their children. Some theoretical speculations concerning the metabolic basis for this unusual phenomenon are presented. The use of the compound should be discontinued.

NUTRITION ABSTRACTS & REVIEWS

Vol. 31, January, 1961

*Inhibitors of vitamins of the B complex. L. J. Daniel.—p. 1.

Inhibitors of the B-Vitamins. In this review, the discussion includes all types of antimetabolites that are inhibitors of the B-vitamins including those which are effective in animals or man. In the past, antivitamins or antimetabolites have been useful in the study of metabolic pathways. Some practical application of certain folic acid antagonists has been made in the treatment of malignancy, especially leukemia. Antivitamins were responsible for the demonstration of man's need of pyridoxine, pantothenic acid, and biotin. The future of antivitamins should be as bright as their past, since new antagonists will doubtless be synthesized to aid in the study of specific metabolic disorders.

NUTRITION REVIEWS

Vol. 19, February, 1961

*Comments on the current food situation. O. V. Wells.—p. 33.

The Current Food Situation. Average per capita food consumption should continue at, or close to, the 1960 level throughout 1961. It is likely there will be more beef and poultry consumed in 1961. Two continuing trends are the downtrend in egg consumption and the continuing shift from milk fat to nonfat milk solids, both of which have been under way since about 1940. Certain legislative questions referring to the special milk and school lunch programs are discussed. Also presented is the recent food resolution of the United Nations General Assembly and the Freedom-from-Hunger Program of the Food and Agricultural Organization.

PUBLIC HEALTH REPORTS

Vol. 76, February, 1961

*The APHA conference report. Food and nutrition.—p. 106.

Breast feeding assures linoleic acid adequacy.—p. 147.

Poisonings by fish need systematic study.—p. 148.

Zero Fahrenheit protects frozen food products.—p. 148.

The APHA Conference Report. This conference report contains summaries of some of the papers given at the 88th annual meeting of the American Public Health Association and related organizations held in San Francisco, October 31 to November 4, 1960. Some of the topics included are environmental health, heart disease, mental health, dental care, school health, epidemiology, and food and nutrition.

Breast-Feeding and Linoleic Acid Adequacy. The significance of linoleic acid in the infant's diet is re-emphasized by preliminary observations from a study of thirty healthy pregnant women and their offspring. From the data evaluated so far, the authors concluded that when linoleic acid comprises from 1.5 to 7 per cent of the calories during the third trimester of pregnancy, the mother's intake of linoleic acid appears to have little influence on the diene fatty acid level in the blood serum of the newborn infant. They observed, however, that it is still to be determined whether a strict exclusion or a high intake of linoleic acid during the latter part of pregnancy influences the offspring's proclivity to develop linoleic acid deficiency. They added: "The natural diet of the newly born infant contains liberal amounts of linoleic acid. Inasmuch as breast milk usually comprises from 3 to 5 per cent of the caloric intake as linoleic acid, it would appear that the prevention of fat deficiency is assured if the infant is breast fed, providing the nursing mother's diet is adequate."

Fish Poisoning. A plan for intensive and long-range studies of poisoning caused by ingestion of intrinsically toxic fish is outlined. Six principal recommendations are presented, which include development of: a better relationship of symptoms with species of fish involved, more effective therapy for victims of fish poisoning, a simple on-the-spot test to determine the quantity of poison present in a fish, pharmacologic studies to determine the physiologic response of test animals to fish toxins, a systematic procedure of information from episodes of fish poisoning, and ecologic study to determine if there is some dependable relationship between one or more identifiable variables in the environment and the appearance of toxic fishes.

Frozen Food Products. If frozen foods were always kept in an environment of 0°F. or lower, or if necessary excursions to moderately higher temperatures were always kept short, there would be no material quality loss during distribution, according to Dr. M. J. Copley, Director of the Western Utilization Research and Development Division, USDA. He stated that even though frozen foods remain entirely wholesome when kept at 10° or 20°F., deterioration in flavor or color soon destroys the sales attractiveness. Freezing does not eliminate bacteria, and 40° and 14°F., are especially significant limiting temperatures. Below 40°F., no food poisoning or pathogenic organism has been reported either to grow or to produce toxin. A temperature of 14°F. is the lowest at which growth of any microorganism is known to occur.

AMERICAN RESTAURANT

Vol. 45, February 15, 1961

*Deep fat frying more profits. C. E. Blackburne.—p. 27.

*Selection and care of cutlery. T. Greer.—p. 45.

Deep-Frying. In six months' time a restaurant operator can spend as much on fat as was paid for the fryer. Production obtained from a pound of fat or oil depends on how it is used; exact control of heat is the most important factor. Five basic changes occurring in fat during frying are explained. Equipment, its cleaning, and temperature controls are discussed. Directions and recipes are included for deep-fried fish, batter-fried chicken, French fries, raised doughnuts, French-fried onions, fried pies, turnovers, fritters, and a variety of fish, vegetable, and chicken dishes.

Knives. Selection and care of these important and most improperly used tools are discussed. The quality of knife blade and type of handle are the first points to note. Twelve types of commercial knives are described, along with information on size, price range, and use for each. Types of edges are considered, and instructions for care and resharpening are included.

THE CORNELL HOTEL AND RESTAURANT ADMINISTRATION QUARTERLY

Vol. 1, February, 1961

*Budgeting: the art of forecasting. D. E. Pitcock.—p. 57.

*The potential of vending for the mass feeding industry. R. W. Wagstaff.—p. 84.

Budgeting. If the budget is to be a means of forecasting the future, it must be clearly understood and effectively carried out. This article defines the budget in all aspects and presents it as a management tool. "Management accounting" is described as a form and technique of accounting dedicated to the planning function and to evaluating operating results by comparisons with preplanning. Methods and procedures used in hotels are presented, including the day-to-day budget, the daily pre-control budget, annual and monthly forecasts, room sales, food and beverage sales, the food pre-cost system, and the payroll pre-control system.

Vending Potential. The history of automatic merchandising, economic factors supporting its growth, and the industry outlook are reviewed. The first multiple-location test of the effect of custom-styled vending facilities on service station operations is now being conducted at five high-traffic stations in the area of Charlotte, North Carolina. Kansas City, Missouri, has the first automatic drive-in restaurant. Supermarkets and

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drug stores may well use vending machines for popular merchandise on a 24-hr. basis. Packaging, food preservation by radiation and new freezing techniques, carry-home items, money changing machines, and styling of equipment are areas in which advances will be made.

HOSPITAL MANAGEMENT

Vol. 91, March, 1961

*Fresh vegetables—new style. M. W. Neale.—p. 54.

Fresh Vegetables. Emphasis is on taste appeal for the elderly, whose appetites wane although they still need the vitamins, minerals, bulk, and variety offered by vegetables. Cooking "rules" are reviewed. Quantity recipes are given for these vegetable dishes: sweet potato rhumba (using rice), butternut squash with maple sirup, eggplant with sour cream, broiled herbed tomatoes, parsnips French style, carrots with bacon, sautéed fresh mushrooms, cauliflower with tomato curry sauce, beets with Parmesan cheese, snap beans with vinaigrette sauce, red cabbage slaw with hot bacon dressing, and Brussels sprouts with caraway seed.

HOSPITALS

Vol. 35, February 16, 1961

*Efficient layout and equipment increase cafeteria sales. R. Silvester.—p. 82.

Cafeteria Sales. The new pay cafeteria for personnel and staff at the 578 bed Alleghany General Hospital, Pittsburgh, was designed with sales in mind. An all-glass divider separates the cafeteria counter from the entrance hallway and gives patrons a view of the 90 ft. stainless steel serving counter and the dining room beyond. A refrigerated lazy-Susan for salad service has increased sales of these items and also cold plates. On-the-counter steamers for vegetable preparation, an electronic oven for entrées and vegetables, rotary ovens, and reach-in refrigerators with mobile shelving have resulted in better preparation and thus greater sales. The meal payment system, serving hours, menus, and numbers and types of employees are described.

INPLANT FOOD MANAGEMENT

Vol. 8, February, 1961

*Nutrition and the cholesterol issue.—p. 33.

*Frozen molds for festive occasions. K. O'Connor.—p. 41.

The Cholesterol Issue. Nutrition research, to date, has not proved a specific relationship between blood cholestrol, dietary fats, and atherosclerosis, heart attacks, and strokes. The public is urged to maintain a balanced diet and to guard against the dangers of sudden, radical changes in food habits. These points are contained in a December, 1960 report from the Nutrition Foundation. A special continuing study financed by a fund of more than $1 million voluntarily contributed by the food industry is being carried on in universities, medical schools, and colleges. The proportions of different kinds of fats and their relation to total calories, sugars, proteins, and other nutrients all have a bearing on the content of fats, including cholesterol, that occur in the blood and other parts of the body. These complex relationships and their implications for good health are being rapidly identified in terms of genetic characteristics, nutrition practices, and factors of environment.

Frozen Molds. Frozen fruit blocks and flower molds are as essential as the punch and food at receptions, teas, and parties at St. Luke's Hospital, New York City. Directions are given for making both.

INSTITUTIONS

Vol. 48, March, 1961

*How to store semi-perishables.—p. 14.

*Master refrigeration program at the Hilton.—p. 38.

*Maintenance is a cost factor in the kitchen. W. L. Kahrl.—p. 70.

*Sanitation for food service workers. T. M. Richardson.—p. 88.

*School lunch management. Part III. S. M. Hartt.—p. 93.

*Which floor . . . where?—p. 116.

Storing Semi-Perishables. There seems to be a general impression that canned, dried, pickled, and chemically preserved foods are stable because they do not show signs of rot or putrification and are free from obvious microbial growth and foul odors. The more serious types of spoilage today are chemical and entomologic (concerned with insect infestation). If semi-perishables are to maintain high quality, definite storage procedures must be followed. This extensive report gives such information for baking stores; beverages; canned goods; condiments, flours, and seasonings; dairy foods and cheese; fats and oils; grains and grain products; sweeteners; miscellaneous items such as beans, dried fruits, jams and jellies; and various types of frozen foods.

Refrigeration Program. Food discoloration; flavor migration; and waste traceable to food storage at too-warm or too-cold temperatures has been practically eliminated in a Denver hotel. Twenty-three separate walk-in refrigerators providing the exact pre-designated temperature for some 500 food items are part of the design of this kitchen. Ranging in size from 8 by 16 ft. to 30 by 15 ft., these refrigerators serve for meat storage, meat aging, meat freezing, vegetable walk-in, vegetable and soup stock, delicatessen, bakers' walk-in, dairy products, ice cream, wine cooler, beer cooler, general beverage cooler, dessert freezer, cart cooler, pantry, and garbage.

Kitchen Maintenance. Preventive maintenance results in a more effective equipment program in any kitchen. The best approach is a system of inspection, recording, and sensible do-it-yourself. A basic maintenance check list is outlined, covering such items as gas, steam, and electric frying equipment; refrigeration; air conditioning; steam tables; dish and glass washers; sewage lines; and equipment motors.

Sanitation. A question inviting continued discussion is that of the value of in-service training courses (including sanitation training). Have they done much for the industry in obtaining and holding good personnel? The answer lies in making each job a challenge and "professionalizing" personnel. Another question relates to the financial problem as it determines which takes precedence—new equipment or the hiring of more personnel.

School Lunch Management. Lunchtime teaching can be effective if records are kept for each child on food acceptance and rejection. Mechanics of such a system are described. Cafeteria service is discussed, along with the importance of food appeal and how to obtain it. Employees' manner and dress as they serve behind the counter, efficient moving of the cafeteria line, serving equipment, and lunch period schedules are other aspects presented.

Floors. Characteristics of floors of all types are included. Recommended surfaces for specific areas, cleaners for hard surfaces, and cleaners for resilient surfaces and sealed wood are outlined.

THE MODERN HOSPITAL

Vol. 96, February, 1961

*Salary survey: who makes how much in hospitals?—p. 96.

How to put variety into soup recipes.—p. 138.

*How to keep diet changes in order. J. Hartman.—p. 142.

Hospital Salary Survey. Statistics compiled by the Department of Labor's Bureau of Labor Statistics in 1960 are the result of surveys in state and local government hospitals, and voluntary and proprietary hospitals in fifteen major metropolitan areas. Sharp salary increases are noted over the past four years. Workers in most categories (including dietitians) earn more in non-federal government hospitals (state, county, city) than in non-governmental (voluntary and proprietary) hospitals. Three tables give information on salaries by occupational classification.

Reporting Diet Changes. To avoid confusion caused by last minute changes in dietary orders, a system is needed which brings a complete listing of every patient from every unit well in advance of each meal every day. The system successfully used at Stamford (Conn.) Hospital is described. A clear plastic envelope covers a guide sheet with columns for changes, floor and room, name, and diet. Entries are made on the plastic cover with a grease pencil. Because it is easily erased, the plastic cover for the daily information is the trick that makes the system work. Other details of the system are described.

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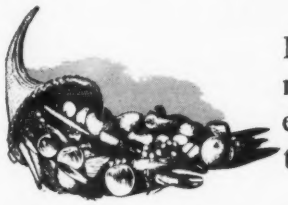

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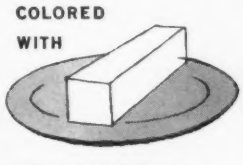

Look for the words: "Colored With Beta Carotene" on the labels of foods you buy, such as margarine, shortening, lard, butter, cheese, salad and cooking oils, confections, yellow baked goods, beverages, and ice cream products. You can be sure that the food processors who use beta carotene have your good health in mind.

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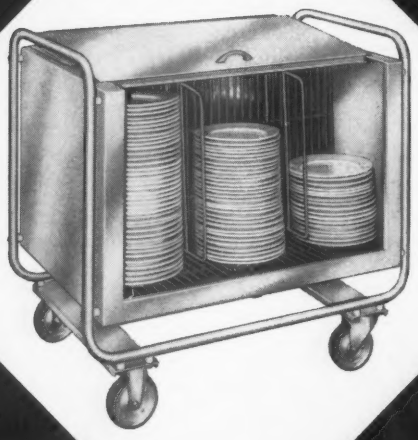

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QUICK FROZEN FOODS

Vol. 23, November, 1960

*Consumer attitudes towards frozen foods. Part II.—p. 36.

Vol. 23, December, 1960

*Commissary freezes varied cook-in-bag menu fulfilling majority of restaurant needs. C. Lieberg.—p. 115.

Consumer Use of Frozen Foods. A consumer study by *Life* Magazine included homemakers in Atlanta, Chicago, Hartford, Los Angeles, Queens, and Westchester. They were asked: "What effect have frozen foods had in your role as a housewife?" "What part do frozen foods play in the feeding and nourishment of your family?" The answers revealed generally that frozen foods were welcome in their homes. Menu planning is easier because of the larger variety of foods from which to select and also because much of the advanced planning could be eliminated. Many believed frozen foods to be on an even nutritional par with the fresh and felt they could provide their families with more vitamins and minerals year-round. Some estimated at least 30 per cent of each meal was selected from the frozen foods and also expressed a desire for more frozen foods. It would seem that frozen vegetables have attained a greater acceptance than other frozen products. In general, the homemakers feel that frozen foods offer a maximum of nutrition with a minimum of time, work, and effort.

Cook-in-Bag Meals. A new corporation in Minneapolis is marketing cook-in-the-bag meals to be used in eating establishments. Fifty different menus, frozen in flexible plastic bags and featuring everything except salads, desserts, and beverages, are now available. After 20 to 40 seconds in boiling water or an electronic oven, the meal is ready to be served. Ease in storing, clean-up, and portion control are other advantages of the prepackaged meals. Heat-sealed compartments in the plastic bags keep different foods separated.

PERSONNEL JOURNAL

Vol. 39, February, 1961

*What every executive should know about psychological testing. W. L. French.—p. 351.

*The psychopathologies of business life. R. Hershey.—p. 359.

*Scaling non-monetary inducements to employment. G. B. Strother and L. Johnson.—p. 363.

Vol. 39, March, 1961

*Overcoming employee dissatisfaction. D. C. Carner.—p. 399.

*The teaching machine for employee development. L. C. Silvern.—p. 413.

Psychologic Testing. Psychologic tests can be categorized in five groups: personality, interest, aptitude, achievement, and mental ability. Examples of each are listed. If an executive is to use them properly, he must understand the problem of validity and reliability. Attention must be given to training the one who administers and interprets the tests. Suggestions are given to help

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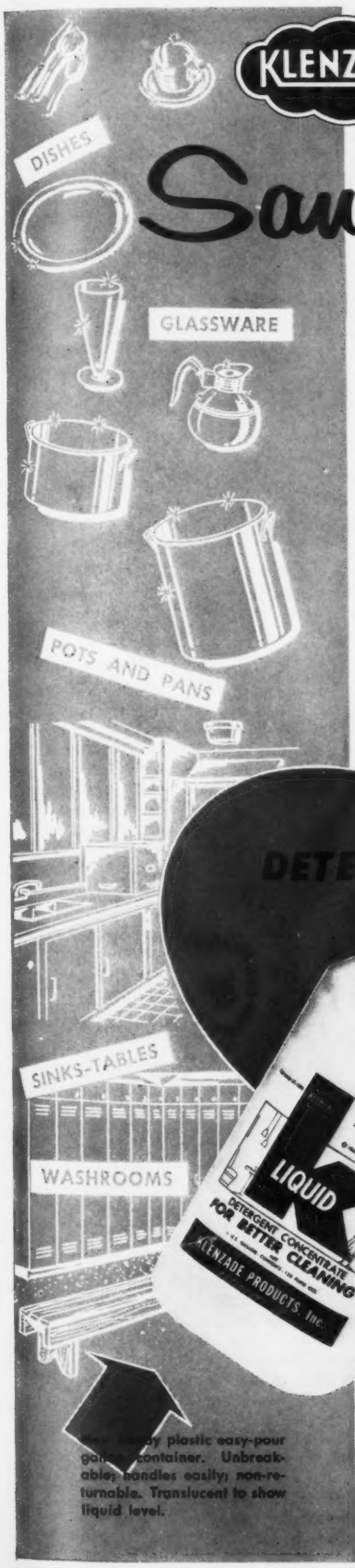

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McHenry. Debunks reducing diets, restores sanity to the subject of nutrition. 160 Pages. 1960. $3.50

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Peyton. 379 Pages. 32-Page Supplement. 41 Illustrations. 1957. $4.00

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Rosenthal & Rosenthal. Simplified Statements with Illustrations Prepared for the Use of the Patient. 237 Pages. 125 Figures and 12 Color Plates. 22 Tables. New 3rd Edition, 1960. $4.50

7. Teaching Nutrition in Nursing

Rynbergen. 142 Pages. 4th Edition, 1956. $2.75

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locate, select, and evaluate the qualifications of those offering psychologic services. Additional problems in the use of tests relate to size of group, cost, employee acceptance, and ethics. Test results should be used as only one factor in the decision-making process.

Psychopathologies in Business Life. Business snafus and incidents of faulty communication are often explainable in terms of common management problems and employee relations. The assumption, the misunderstanding, the oversight, and the clerical error are all expressions of psychopathologies. The major part of the cure is the recognition of the symptom.

Non-Monetary Inducements to Employment. Six different kinds of job inducements were presented to 209 male college juniors and seniors in business courses to determine what values other than monetary were considered important in accepting a job. These students were strongly attracted by features bearing directly on personal advancement, somewhat attracted by convenience services, and comparatively indifferent to the professional perquisites of the job. Another type of student might give a different scale of values. It would seem that the utility of employee benefits is not related in any single way to the cost of the benefits; psychologic scaling methods offer a way of determining the optimum use of the benefit dollar.

Employee Dissatisfaction. Getting to the bottom of a personnel trouble spot usually hinges on an exchange of information. A program is presented which will solve many rumor and dissatisfaction problems *before* they occur. It includes: (a) keeping employees informed by the printed word, face-to-face contacts, and information programs; (b) telling employees *why* in addition to *what;* (c) using simple, understandable terms; (d) anticipating problems and taking action immediately; (e) working out a follow-up system; (f) employing well adjusted people; (g) recognizing good work; (h) getting acquainted with employees; and (i) improving personnel policies (including grievance procedures).

The Teaching Machine. Present-day activity with the teaching machine comes from two separate origins: the Air Force group (psychologists who worked on training-oriented teaching machines) and the university group (psychologists who developed the education-oriented teaching machines). Convergence of the education and training philosophies occurred in 1958 and 1959. Criteria for teaching machine technology are stated as follows: (a) Instruction is provided without a human instructor. (b) Learning occurs at the learner's rate. (c) The learner receives immediate knowledge of his progress. (d) There is participative, overt interaction between the learner and the machine. (e) Instructional material and the sequence is carefully controlled and consistent. (f) Reinforcement or reward is used to strengthen learning. Operation of a typical machine is explained and diagramed. Areas of application of the method are listed and include new employee orientation, apprentice instruction, language instruction, technical training, and plant safety instruction.

RESTAURANT MANAGEMENT

Vol. 88, February, 1961

*The three challenges of Lent. A. Easton.—p. 46.

*Status report on sanitation.

Report 1: National Restaurant Association. D. Greenaway and C. L. Kegler.—p. 57.

Report 2: Public Health Service code.—p. 62.

Report 3: St. Louis grading system.—p. 64.

Report 4: National Sanitation Foundation.—p. 66.

Report 5: State and municipal health agencies.—p. 68.

Report 6: State restaurant associations.—p. 74.

Report 7: Administration of the food sanitation program and the manager's role in a planned sanitation program. L. E. Bond.—p. 76.

Report 8: Basic bacteriology for food handlers. J. C. White.—p. 79.

Challenges of Lent. Three problems present themselves with Lenten menus: (a) The pattern of winter menus is changed as more fish, cheese, and eggs are served—people resist change. (b) Some people feel they are deprived of their favorite foods. (c) There can be monotony in Lenten menus. To overcome these problems, new and unusual dishes can be introduced, specials can be advertised and dramatized, fruit desserts can be featured (for those not eating pastries), attention can be directed to low-calorie items, and variety can be emphasized. Recipes are included for scallops Lorraine; cheese, rice and nut patty with stuffed olive and tomato sauce; and minted pears with vanilla ice cream and fudge sauce.

Sanitation Report. This extensive section contains information on sanitation as it is, as it should be, and as it must be if the restaurant industry is to perpetuate itself. Report 1 presents the viewpoint of the restaurant industry on the sanitation code as originally laid down in 1943 by the U.S. Public Health Service and also includes suggested revisions now under study. Report 2 explains how the Public Health Service is proceeding with the revision of the 1943 code and why. Report 3 tells of the grading system for restaurants, established in St. Louis in 1946 (following closely the recommended Ordinance and Code of the U.S.P.H.S., establishing three grades of restaurants: A, B, and C). In Report 4, the National Sanitation Foundation emphasizes that safe, clean food handling and service is a community problem and not just the burden of public eating establishments and the official agencies reg-

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ulating them. The activities and aims of the Foundation are discussed. Report 5 is the local-level approach to sanitation. Seven leading state and city health officers and agencies give their views on standards in the food service industry. Report 6 contains comments from executive secretaries of state restaurant associations as to how they have worked out problems with state and local authorities. Report 7 deals with management's obligation to carry on an adequate sanitation training program with and through employees. In the final report, number 8, basic bacteriology for food handlers is introduced.

VOLUME FEEDING MANAGEMENT

Vol. 16, February, 1961

*Maneuvering with your menu.—p. 13.
*Beverages . . . the all-important details. E. Blair.—p. 21.
*Dates . . . exotic 'convenience' food.—p. 24.
*Marinades . . . for flavor plus tenderness.—p. 27.
*Product evaluation report: coffee brewing equipment.—p. 49.

Vol. 10, March, 1961

*Baking mixes . . . a new basis for planning. E. Blair.—p. 30.
*Bread cubes and crumbs . . . easier ways to make them.—p. 34.
*Pies . . . new types suggest new uses.—p. 37.
*Layout and equipment ideas: School cafeteria redesign could save 17 employees. O. Webber.—p. 53.
*Product evaluation report: hot food holding equipment.—p. 59.

Maneuvering with the Menu. Five types of food service can be found at New Orleans' new Moisant International Airport. The luxury dining room, a coffee shop, an employee cafeteria, a stand-up snack bar, and an in-flight catering service share a single production kitchen and centralized dishwashing facilities. Features of the operation are described and pictured.

Beverages. The most important beverage to most Americans is coffee. Blends and roasts influence the character of the coffee and preferences vary regionally. Italian coffee or cafe espresso is becoming popular in this country as a demitasse. Seventeen steps to brewing good coffee are outlined. Characteristics and preparation methods for chocolate drinks and tea are included.

Dates. This fruit is no longer a strictly imported item. Some 9 million lb. California dates are produced each year. The technical difference between imported dehydrated dates and fresh California dates is a chemical one—difference in the character of the natural sugar. Invert sugar makes the imported product soft and pliable. Sucrose gives the California date a smoother texture. Information on storage and use in desserts and salads is included.

Marinades. These savory concoctions began as simple brines for preserving fish. Today, a marinade

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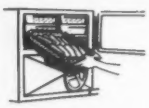

The compartment cooks vegetables, meats, poultry; fish, eggs, rice and combination dishes; thaws frozen foods, heats canned goods, blanches potatoes, precooks meats and vegetables.

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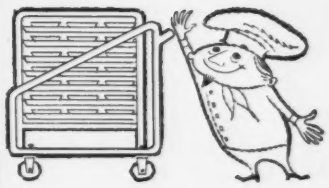

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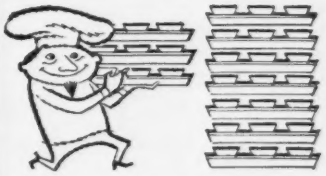

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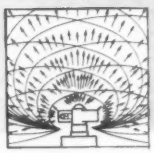

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Coffee Brewing Equipment. Discussed are the essential features of a coffee brewer, figuring coffee production, best types of urns, advantages of smaller units, guides to quality-built equipment, advantages of automatic controls, and filters. The equipment of nine manufacturers is described.

Baking Mixes. Today's mixes are the means to enlarged, more enticing menus and to the creation of house specialties. Suggestions include hamburgers between kitchen-baked fresh onion buns and dollar-size pancakes with mandarin orange sauce, served with fried chicken. Recipes are given for angel cream cake with lime sauce, turtle cookies, mandarin orange sauce, spicy prune upside-down cake, and iced date biscuit rolls.

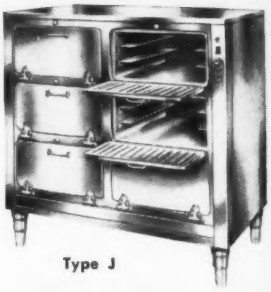
Bread Cubes and Crumbs. Pictures and instructions show bread cubes made with the food cutter, soft crumbs made in the mixer, and dry crumbs made with the coarse shredder plate of a disc-type vegetable slicer or the attachment hub of the meat grinder. One ⅝-in. slice of bread makes about 1 cup soft bread cubes. Or, it yields about ¾ cup dry or toasted bread cubes or ⅓ cup dry bread crumbs.

New Pies. Pies are no longer limited to dessert. Savory custard mixtures baked within a crust serve as entrées and hors d'oeuvres. Vegetable pies are supporting dishes to meat or poultry. Salad pies, such as tomato aspic in a herb-seasoned crust, or a gelatin with citrus sections in a regular pastry shell, team with cold sliced meat, cheese, or a second salad of seafood or fresh fruit. Spiced crusts for dessert pies are enumerated, glazed and iced tops and streusel top crusts are suggested, and various fillings—fruit, chiffon, and ice cream—are described. Eleven new pie recipes are given.

School Cafeteria Design. Redesign of a well-run senior high school cafeteria plant (Plan A) is described. The facility serves 2400 students as follows: 1200 hot meals, 450 snack bar, and 750 sandwich and milk room. Seventeen employees could be eliminated by pre-proportioning desserts, salads, and the like on pre-sized paper service on the line; by introducing the "zero food bank" concept of operation; using disposable tableware and service ware; using pre-purchased meal tickets and single item tickets; and using vending machines for milk and other drinks.

Hot Food Holding Equipment. There are four basic types: infra-red, for short holding periods; enclosed cabinet and drawer units for longer

CAFETERIA LINES too slow?



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The relative unpalatability of special diets often leads to dissatisfaction and even "cheating." The juice of fresh Sunkist lemons has been found most useful in improving the palatability of these 3 common regimens:

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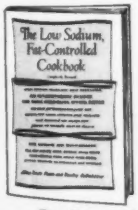

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I enclose a check or money order for $____(send $1.50 for each copy ordered).

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storage; hot food serving tables and carts; and insulated containers for transporting food to distant serving points. Heat and moisture controls are discussed, and each type of equipment is described. New equipment of four manufacturers is listed.

WHAT'S NEW IN HOME ECONOMICS

Vol. 25, January, 1961

*Teaching nutrition to teen-agers. R. M. Leverton.—p. 52.

*The use of chemicals in the growing of food. B. Clinton.—p. 54.

Vol. 25, February, 1961

*The importance of reading labels and following directions.—p. 28.

Basic guide to good nutrition. E. F. Phipard. p. 30.

Vol. 25, March, 1961

**What's New* learns how a food product is developed. F. L. Beinert.—p. 32.

*The war on obesity. A. M. Wilson.—p. 34.

Teaching Nutrition to Teen-Agers. Effective nutrition education for adolescents revolves around the concept that "eating well will help you in what you want to do and be." The teacher can arouse teen-agers' curiosity and make them proud of their powers of observation and reasoning and of their potentiality for controlling their own lives and influencing the lives of others. Intelligent control over our food environment can be gained through the biologic, physical, and social sciences, and through the development of skills (in food selection, in preparation, in management, and in forming good habits).

Chemicals in Growing Feed. The question of organic vs. inorganic gardening is before the American public today. Commercial fertilizers give these benefits: (a) More high quality food is produced on the same acreage at a much lower cost. (b) Well fertilized crops are higher in food value. No matter what the origin of the plant food, the elements and forms in which they are absorbed by the growing plant are essentially the same. Organic matter is especially beneficial for improving soil structure; however, there are still certain chemical elements (especially nitrogen) which should be added to the soil for the most efficient production. Agricultural scientists agree that foods grown with the proper use of chemical fertilizers are safe for the consumer and have nutritional value equal to or greater than those grown with organic fertilizers.

Reading Labels. Labels carry certain information required by law, and also, in many cases, directions for use. Surveys indicate that many homemakers ignore such information and consequently produce inferior products. Suggestions are given for carrying on a classroom discussion on the subject, preparing products both correctly and by making typical homemaker-errors, such as overmeasuring, overbeating, or using milk where water is recommended.

Food Product Development. Here one gets insight on the development of a new food product, instant whipped potatoes in flaked form. The idea for the flaked form originated in the USDA's Eastern Utilization Research and Development. Then industry stepped in to apply its resources, building a pilot plant for manufacture, and trying and proving testing procedures to improve the product prior to full-scale marketing. The entire evolution of the product is described and pictured.

War on Obesity. For years, weight-reducing plans and aids have been used without too much success. The introduction in November 1959 of a ready-mix milk shake-like drink as an alternate for a reducing diet was an immediate success with both doctors and patients. However, there are dangers involved in its use. The formula diet is not a substitute for a balanced diet over a long period of time (an effective weight-control program involves a new pattern of eating; firmly established new food habits and attitudes toward food must be developed for continued success). Because the ready-mix formulas provide the Recommended Dietary Allowances for vitamins, additional vitamin intake can produce undesirable results. Other factors requiring caution are discussed. Also mentioned is a calorie-packed emulsion formulated for weight gain.

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Give you the quantities and consistencies for every need

FOR MASS FOOD PREPARATION. Gallon-size Waring CB-4 Blendor is specially designed for heavy institutional use. Features life-time lubricated, heavy-duty push-button motor. Easy-pouring stainless steel container and cover. Removable blades for simplified cleaning. Operates on 115 volt AC current. 230 volt model available.

FOR SMALLER QUANTITIES, DIET KITCHENS, ETC. A new, more powerful motor and 37½ oz. stainless steel container make the Waring LB-1 first choice for preparation of smaller quantities where dependability and efficiency of operation are also important factors. Where laboratory use involves highly corrosive materials, a specially built model is available.

FOR EXCELLENT, LOW COST PERFORMANCE. Many institutional users find this finest home-use model meets their requirements perfectly. A two-speed unit, it features the high torque 115 volt AC motor that assures ample blending power for practically any job. Comes complete with two-piece measuring cup lid and convenient detachable handle. Model DL-202.

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Enough seasoning for a complete meal! Even though not filled to the top, each Morton Midget contains more than enough salt or pepper for a full meal.

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New York Academy of Medicine Honors Dr. McCollum. On January 5, Dr. Elmer V. McCollum, honorary member of A.D.A., became the fifteenth recipient (in thirty-two years) of the New York Academy of Medicine's Medal. Dr. McCollum was cited for "his basic research which ushered in the era of the newer knowledge of nutrition; his fruitful efforts which contributed to the eradication of deficiency diseases; his demonstration of the tremendous significance of nutrition, not just for the prevention of disease, but also for the promotion of health and prolongation of life; and his influence upon the dietary habits of man throughout the world through his research, writing, and teaching." Presentation was made by H. D. Kruse, Executive Secretary of the Academy's Committee on Public Health.

Children's Bureau Appointment. Mary C. Egan has been named Chief of the Nutrition Section, Division of Health Services, U. S. Children's Bureau. Miss Egan has served as Assistant Chief of the Section since 1958. She holds a Master of Science degree with a major in nutrition from Cornell University and a Master of Public Health degree from Harvard, where she majored in Maternal and Child Health.

Army Dietitian Cited. Major Elsie K. Miller, Chief, Food Service Division, U.S. Army Hospital, Ft. Devens, Massachusetts, was recently awarded the Army Commendation Medal. The citation was made for meritorious service between November 12, 1957 and September 14, 1960, during which time Major Miller served as Chief, Food Service Division, 34th General Hospital, La Chapelle-St. Mesmin, France.

1961 Golden Plate Award. For the first time, the food service industry's "Golden Plate Award" this year will go to a woman—Helen Corbitt, Director of Restaurants, Neiman-Marcus, Dallas. The award is given annually to the food service operator of the year by the Institutional Food Manufacturer's Association. Miss Corbitt, who will be honored at the 7th Annual Golden Plate Award Presentation on May 22 in Chicago, is a graduate of Skidmore College and a former hospital dietitian, having served on the staff of Cornell Medical Center as an administrative dietitian. She has also been Manager, Houston Country Club; Director of Foods, Joske's, Houston; and Executive Manager of the Food Department, Driskill Hotel, Austin, Texas. She was chosen for the award by a jury made up of the editors and publishers of twelve business magazines.

Food Technology Awards. Emil M. Mrak, Chancellor of the Davis Campus, University of California, has been named the recipient of the 1961 Babcock-Hart Award of the Institute of Food Technologists. The Award is made to "an individual who has made outstanding technologic contributions which directly affect the nutritional well-being of the public." Donated by the Nutrition Foundation, it carries with it a $1000 honorarium and an engraved plaque. Dr. Mrak was also the Nicholas Appert Awardee of the Institute in 1957, and the following year, was elected President of that organization.

A second award of the Institute of Food Technologists for 1961 goes to Swift & Co., for its discovery and refinement of Proten, an ante-mortem injection of highly refined papain solution for tenderizing meat. A large bronze plaque will be presented to the company at the 21st Annual Meeting of the Institute in New York City, May 7 to 11. Five Swift men will be cited also for their parts in the development of the new process: Paul A. Goeser, Harry F. Bernholdt, Dr. William O. Reece, Dr. John M. Hogan, and Jack F. Beuk.

Plentiful Foods MONTHLY LIST

The USDA has listed the following foods as those expected to be in plentiful supply during May:

Chickens—broilers and fryers
Milk and dairy products
Peaches—canned freestone
Potatoes
Turkeys

Frozen Foods for May. The following frozen foods, in institution-size packs, show promise of being generally available during May, according to the National Association of Frozen Food Packers.

Frozen Fruits

APPLES—Until the new crop comes in, frozen apples are recommended for meat accompaniments and desserts, too.

BLUEBERRIES—Loose-frozen blueberries go right into pancake or muffin batters without defrosting.

FROZEN CONCENTRATED ADES—The time is coming when a glass of lemonade or limeade is appealing with meals or snacks.

FROZEN FRUIT DUMPLINGS—New to the list of possibilities available in ready-prepared frozen desserts.

Frozen Vegetables

BEANS, ITALIAN—Use because of their unusual flavor.

BEANS, WAX—Although not as generally available, their appeal is great.

CAULIFLOWER—Serve with a light touch of butter or margarine and some paprika—or, with a butter-crumb topping sprinkled with basil. With cheese sauce, cauliflower is a popular luncheon dish.

POTATO PRODUCTS—The variety available is increasing, and their use saves time and labor. Use to increase menu choices.

Summer Study Opportunities. Again this year, a "Graduate Summer Session of Statistics in the Health Sciences," sponsored by the Schools of Public Health of the United States, will be held at the *University of Minnesota* in Minneapolis. The dates will be June 15 to July 28. This will be the fourth year for this cooperative program made possible by a research grant from the Division of General Medical Sciences of the National Institutes of Health. Agencies sponsoring the program include the Statistics Section, American Public Health Association; National Office of Vital Statistics; and the state departments of health of Minnesota, Iowa, South Dakota, North Dakota, and Wisconsin. One week each will be devoted to the following five topics: bioassay and biomathematical models, statistical epidemiology, statistical genetics, non-sampling errors, and data availability systems (electronic data processing). Further information may be obtained from Vernon E. Weckwerth, School of Public Health, 1325 Mayo Building, Minneapolis 14.

* * *

At *Iowa State University* this summer, two special courses offering graduate credit will be given. The first, "Special Topics," to be presented June 12 to 30, will emphasize either purchasing or organization and management, depending on the majority of requests from registrants. Three quarter-hour credits will be earned in this course. The second, a "School Food Service Workshop," July 17 to 26, will be offered for 2 quarter-hour credits. It is designed primarily for directors, managers, and supervisors of either single or multiple units, and of city or state school lunch programs. It should, nevertheless, be helpful to those concerned with other types of quantity food service. Admission to the Graduate College should be obtained prior to registration if graduate credit is desired for either the workshop or the special topics course. Further information may be obtained from: Dr. Grace M. Augustine, Head, Department of Institution Management, Iowa State University, Ames.

* * *

From July 2 to 8, a "Workshop on Rehabilitation of the Disabled Homemaker" will be presented at *Michigan State University*, East Lansing. The program is planned to provide training to professional persons and students who have, or plan to have, re-

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Looks and tastes like milk... offers nourishment comparable to that received by infants who are successfully breast fed. Immediately acceptable to the newborn, it helps the infant make an easy transition to fresh milk later.

Excellent protein and calorie utilization. A recent clinical study[1] indicated that infants receiving Modilac, in general, performed more efficiently than those of the control groups; weight increment from 2 to 16 weeks was highest; weight gain *per unit* of protein or *per calorie* consumed was greatest.

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The carbohydrate modifier in Modilac is high in dextrins, low in reducing sugars . . . provides "spaced" CHO assimilation.

Corn oil replaces butterfat, helps to maintain linoleic acid blood serum levels comparable to those of breast fed infants . . . assures optimal caloric efficiency.[2] Added vitamins A, C, D, B_6 and thiamine appropriately supplement the natural vitamin content.

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1. Mosovich, Luis L., Pessin, Vivian and Lowe, Charles U.; Effects of Milk Composition on Baby Composition, AM. J. Dis. Child. **100**: 791-792, 1960.
2. Adam, Doris J. D., Hansen, Arild E. and Wiese, Hilda F.; Essential Fatty Acids in Infant Nutrition, J. Nutrition **66**: 555-564, 1958.

sponsibility in working with disabled homemakers or establishing or supervising programs that in some way involve such rehabilitation. Special attention will be given to the management of the resources of the disabled homemaker. The workshop will be financed by the Michigan Heart Association. Three term credits may be earned by qualified persons. Further information is available from: Continuing Education Service, Kellogg Center, Michigan State University, East Lansing.

The sixth hospital dietetic workshop will be presented July 17 to 21 at *Tuskegee Institute*. The program, with the theme, "Adequate Nutrition—The Keystone for Health and Longevity" —will include sessions on personnel training, organization and management, purchasing and storing, the modified diet, nutrition education, and the White House Conference for the Aged. It is planned to help dietitians and food service supervisors and workers in small hospitals and nursing homes.

Coming Events. *National Hospital Week*, May 7 to 13. Theme: "Your Hospital—A Community Partnership."

42nd Annual *National Restaurant Convention and Educational Exposition*, Chicago—May 22 to 25.

110th Annual Meeting, the "World's Fair of Medicine," of the *American Medical Association*, New York City—June 25 to 30.

52nd Annual Meeting of the *American Home Economics Association*, Cleveland—June 27 to 30.

3rd International Congress of Dietetics, London—July 10 to 14. Theme: "Tradition, Science, and Practice in Dietetics."

Gordon Research Conference on Food and Nutrition. Colby Junior College, New London, Connecticut, will again be the scene of the Gordon Research Conference on Food and Nutrition. The dates this summer will be August 12 through 25. Subjects on the program will include: food additives, special nutrition problems, fatty acids and tocopherol, carbohydrates and nutrient utilization, nutrition and disease, future food problems, and obesity and atherosclerosis. Among the speakers scheduled to make the presentations are: Bernard L. Oser, Herbert Pollack, Robert S. Harris, Willard A. Krehl, Nevin S. Scrimshaw, Elmer L. Severinghaus, Theodore Van Itallie, Albert J. Stunkard, Laurance W. Kinsell, and a number of others.

Details of the program may be obtained from: W. George Parks, Department of Chemistry, University of Rhode Island, Kingston.

Omicron Nu. The biennial conclave of Omicron Nu will be held this year at Purdue University, Lafayette, Indiana, June 22 through 24. Two new chapters of Omicron Nu have been installed this year: Alpha Sigma Chapter at the University of Arizona, Tucson, and Alpha Tau Chapter at Brigham Young University, Provo, Utah.

Shared Dietitians Meet. On April 26 to 29, what we believe to be the first meeting of shared and part-time dietitians was sponsored by the Nutrition Service of the Iowa State Department of Health. Twenty persons in this field attended. The program included:

"What's New in Nutrition and Diet Therapy as Related to Small Hospitals?"—Mary Macomber, Director, Nutrition Service, Iowa State Department of Health

"Why Your Health Department Is Interested in Upgrading Food Service in Small Hospitals"—Edmund G. Zimmerer, M.D., Commissioner, Iowa State Department of Health

"How a Hospital Administrator Feels about Shared Dietitians"—Donald Carter, Administrator, Murphy Memorial Hospital, Red Oak

"What Are Our Problems and Solutions?"—a panel discussion moderated with Anna Jernigan, Dietary Consultant, Iowa State Department of Health, at which seven part-time dietitians discussed their work. Summing up was done by Mary Reeves, Regional Nutrition Consultant, U.S. Children's Bureau, Chicago.

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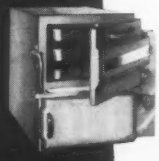

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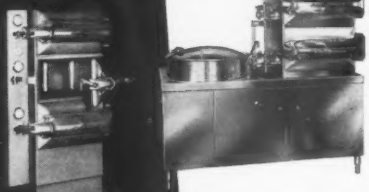

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There are many chapters in the story of cereal food enrichment . . . and many still to be written. But the most important thus far is the "Quiet Miracle"—better health for all America—through better nutrition for all.

Just 20 years ago, millers and bakers began enriching their products with specified amounts of the three B-vitamins—thiamine, niacin and riboflavin—and with the mineral, food iron. Since that time, three nutritional-deficiency diseases related to lack of those vitamins—beriberi, pellagra and ariboflavinosis—have almost disappeared. Incidence of iron deficiency anemia has been reduced.

The "Quiet Miracle" may be assessed in terms of illness never experienced . . . in types of disease physicians no longer see.

If you are skeptical—you might consider another chapter*—studies of chronic alcoholics in the "skid-row" section of Chicago, whose diet consists mainly of liquor and bread. Before enrichment, these men were notoriously subject to nutritional deficiencies. After enrichment, symptoms of vitamin deficiency were difficult to find. Bread was their only source of vitamins. Enrichment the only change.

Thus two chapters in the "Quiet Miracle"—symbolized here by the shining face of a healthy child and the picture of a "skid-row" bum. For additional chapters, fill out the coupon below.

*"Lack of Avitaminosis Among Chronic Alcoholics," U.S. Army Medical Nutrition Laboratory.

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New Sanitation Standard. The National Sanitation Foundation has issued No. 7 in its series of Sanitation Standards. This one pertains to commercial refrigerators and freezers. It includes definitions as well as standards for design and construction, recommended installation and service, and an appendix on materials and finishes. The standard, adopted formally in August 1960, has been implemented by the National Sanitation Foundation Testing Laboratory with a program of evaluation and performance testing of commercial refrigerators and freezers. Manufacturers whose equipment meets these standards will be authorized to use the National Sanitation Foundation Seal of Approval after May 22.

Publications. From the Agricultural Experiment Stations of Alabama and Georgia comes a new publication, *Meat Choices for Family Meals in Selected Cities—Alabama–Georgia.* In it, the use of meat by 817 families in eleven Alabama and two Georgia cities of 10,000 to 25,000 population, as determined by a survey, are reported. Breakdowns of the data include: meats used, meats selected for special meals, preparation methods for poultry, motivation behavior toward food choice and expenditures, acceptance of frozen meat, and influence of promotional, educational, and other media on food marketing. Requests for this report (Southern Cooperative Series Bulletin 77), from outside Alabama and Georgia, should be addressed to the Agricultural Experiment station, Auburn University, Auburn, Alabama.

* * *

A list of publications produced by a research project on "Child Care Problems of Physically Handicapped Mothers" has been compiled and is available gratis from the School of Home Economics, The University of Connecticut, Storrs. Included are films, color slides, bulletins, posters, exhibits, and bibliographies. Prices for all listings are given; all are being distributed at cost.

* * *

"Federal Agencies Financing Research" is a twenty-six-page report designed to help persons or companies hoping to work on government research projects. The "Guide" provides information on programs, procedures, and organization of each government agency awarding such contracts, as well as the officer to approach for further specifics. By following the suggestions, interested groups will be able to fit their qualifications and facilities to the needs of the appropriate government departments. A subject cross-reference keys readers to proper agencies. Copies may be ordered for $1 each from Social Legislation Information Service, Inc., 1346 Connecticut Avenue, N. W., Washington 6, D. C.

* * *

A mimeographed bibliography, "Selected List of Nutrition Education Materials for Teachers," has been prepared as part of the Nutrition Education Research Project at Teachers College, Columbia University. The listings are divided into three groups: general references, including books, booklets, pamphlets, leaflets, and visual materials; kindergarten through third grade—for both the teacher and the children; and fourth through sixth grades—also for both teacher and children. Also helpful will be a list of organizations, with their addresses, from which source materials are available. Copies may be requested from: Willard J. Jacobsen, Director Nutrition Education Research Project, Teachers College, Columbia University, New York 27.

World Health. Peter E. Joyce of New York City, recently retired after serving the Shell organization all over the world, was named President of the National Citizens Committee for the World Health Organization in March. Mr. Joyce is the first President of this organization to come from outside the medical profession.

The NCC reports that, at the 14th World Health Assembly held in February in New Delhi, India, the Republic of Mauritania was admitted to full membership in the World Health Organization and the UN Trust Ter-

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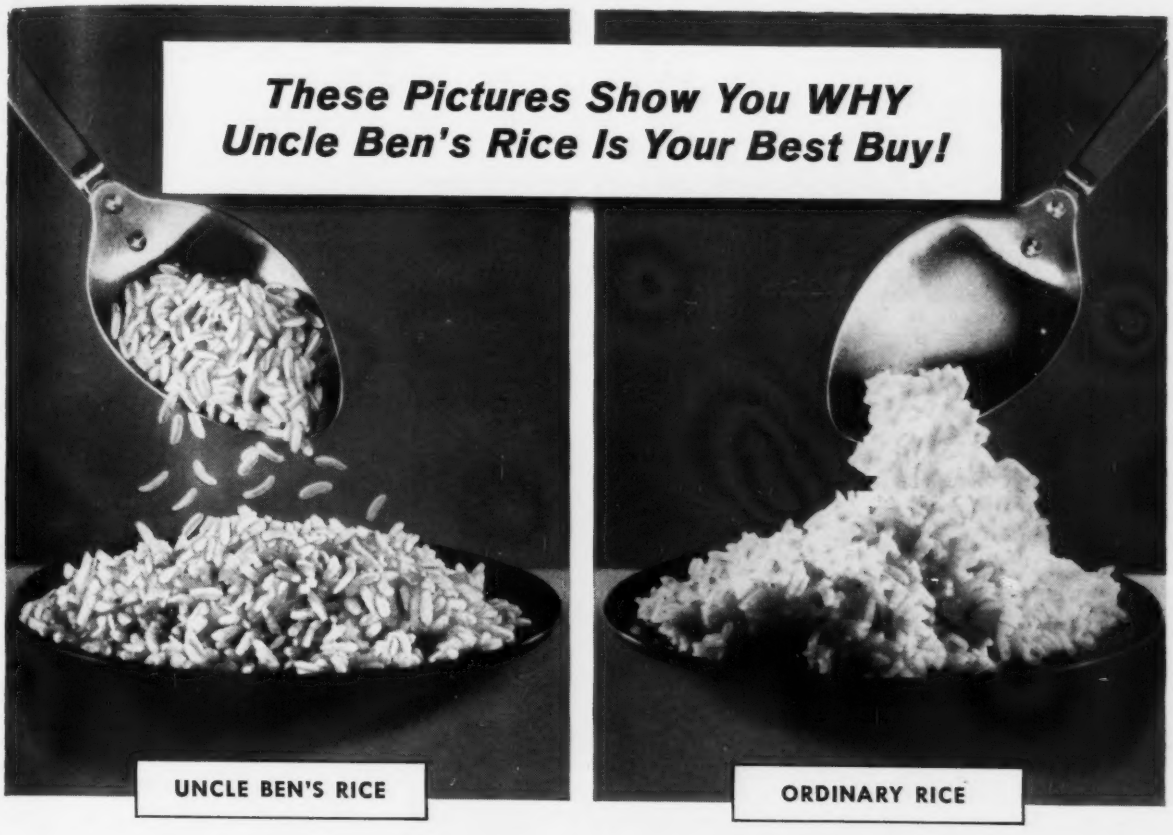

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ritories of Tanganyika and Ruánda-Urundi as associate members. The WHO now has 105 full members and four associates.

A review of the progress of the global malaria eradication campaign showed that of a total of 1,336 million persons living in malarial regions in 1955, 298 million or 22.3 per cent now live in malaria-free areas, due to eradication measures. Another 612 million, or 45.9 per cent, are being protected through eradication programs which are already well under way; and 170 million, or 12.7 per cent, are in areas where preliminary eradication processes are taking place.

News of State Associations

Arizona Dietetic Association. The joint Committee on Education Through Libraries of the Arizona Dietetic and Home Economics Associations has prepared a second list of books and pamphlets on various phases of homemaking, which has been sent to libraries throughout the state to serve as a guide for selections for their collections. A separate list of approved books on nutrition was also compiled and sent to the libraries.

Central District (Phoenix area) dietitians worked with the Maricopa County Nutrition Council in preparing for a workshop which was given on nutrition, at four weekly sessions, beginning on March 14. Special speaker for the March 28 workshop meeting was Fredrick J. Stare, M.D., Ph.D., Head, Department of Nutrition, Harvard School of Public Health, Boston.

California Dietetic Association. "New Horizons—Reflections and Projections" is to be the theme of the 1961 spring convention of the California Dietetic Association, to be held in Santa Monica, May 5 and 6. Special features of the program will include:

"The Time for Appraisal"—Milton Gordon, Ph.D., San Fernando State College

"Current Research in Nutrition"—Dr. Ralph Hall, Scripps Clinic and Research Foundation, LaJolla

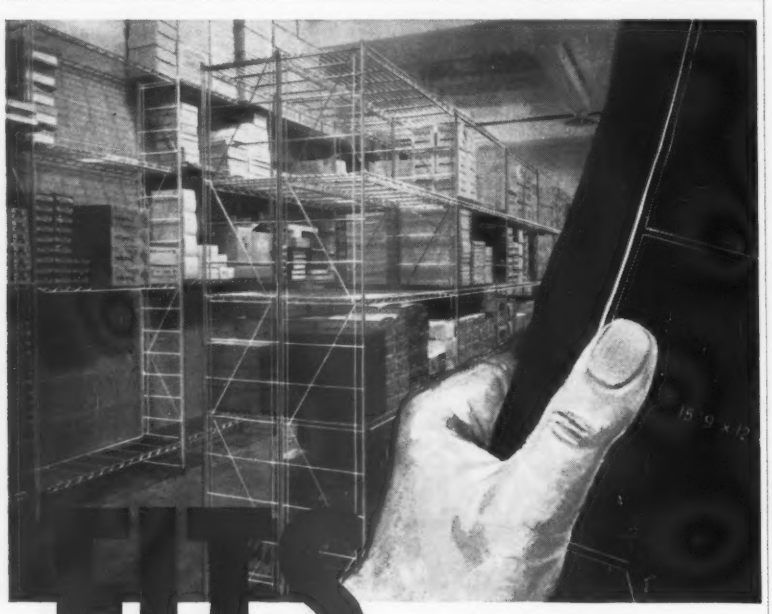
"The Professional Image"—Gertrude Miller, A.D.A. Speaker of the House of Delegates

"A Personal View of the Fifth International Congress on Nutrition"—R. LaJeune Bradford, Nutritionist, Los Angeles County Health Department

"The Dietitian Meets the Requirements of Hospital Administration"—a panel discussion between a hospital administrator and two hospital administrative dietitians

New Jersey Dietetic Association. On March 21, Dr. William J. Dougherty, Director, Division of Preventable Disease, New Jersey Department of Health, spoke to members of the New Jersey Dietetic Association on "Dietitians Meet the Challenge of New Health Programs." The meeting, held in East Orange, was co-sponsored by the Community Nutrition and Education Sections of the *North Jersey Dietetic Association.* In February, members of the North Jersey Association, meeting in Newark, saw new food items demonstrated, received tips on food purchasing and "standardized beef."

New York State Dietetic Association. David Schachter, M.D., delivered the annual Mary Swartz Rose Memorial Lecture this year at the kick-off session of the New York State Dietetic Association's spring meeting in New York City, on April 19. His topic was: "The Regulation of Calcium and Iron Absorption." Members of the Health and Welfare Section of the South Eastern District Home Economics Association were invited as guests for the lecture, which is sponsored each year by the *Greater New York Dietetic Association.* Dr. Schachter is Assistant Professor of Medicine, Columbia University College of Physicians and Surgeons. His research interests have been in the field of cellular transport mechanisms and their general biologic importance in regulating the internal environment of the body.



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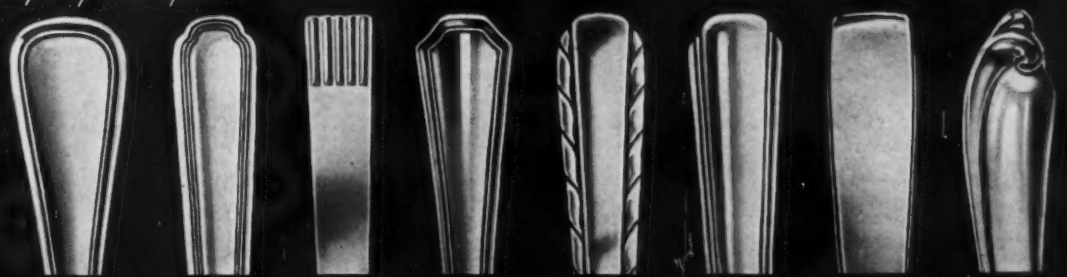

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Rhode Island Dietetic Association. An annotated bibliography of thirteen selected publications for use by persons with diabetes has been prepared jointly by members of the Rhode Island Dietetic Association and the state Department of Health. It was first distributed in November at a series of four Diabetes Fairs at which the Dietetic Association presented an exhibit. The display included food models for three meals for a 1500-calorie diet. Educational materials, including the bibliography and a leaflet on normal nutrition featuring the four food groups for meal planning, and Exchange Lists, were distributed.

South Carolina Dietetic Association. The 24th Annual Meeting of the South Carolina Dietetic Association was held on February 18 in Clemson. The state Home Economics Association and Home Economics Student Clubs met at the same time, the banquet and several sessions being joint affairs. Highlights of the joint sessions were tours of Clemson College's Textile, Agriculture, and Foods Departments, followed by a tea given at the home of the College's president. An outstanding feature of the program was a paper on "The Dietary Treatment of Hypercholesteremia" by Dr. Milton Nichaman, Lipid Metabolism Laboratory, Medical College of South Carolina. A.D.A. representative at this meeting was Edith Jones.

The following are officers of the South Carolina Association for 1960-61: President, Adelaide F. Dorsey, Columbia Hospital; President-Elect, Caroline Richardson, Greenville General Hospital; Secretary, Annie Poteet, Medical College of South Carolina, Charleston; and Treasurer, Mary Brewer Derrick, VA Hospital, Columbia.

Tennessee Dietetic Association. April 14 and 15 were the dates of the spring meeting of the Tennessee Dietetic Association in Memphis. The program included:

"Food Science and Space"—Kay Schuele
"Weight Reduction on a Proprietary Formula and Its Nutritional Implication"—Dr. I. Frank Tullis
"Quality Food and Wine Cookery"—Frances Floore
"Food Facts Talk Back"—Virginia Harger
"Women, U.S.A.—A Vital Part of the Labor Force"—Augusta Clawson

Miss Harger, who is A.D.A. Secretary, attended the meeting as the representative from the national Association.

Vermont Dietetic Association. In November, the Vermont Dietetic Association presented a workshop on nutrition for over a hundred teen-agers and youth leaders in Burlington. Featured speaker of the event was Dr. Edna Sostman of Douglass College, New Brunswick, New Jersey. A panel of Vermont experts aided in telling why nutrition is important to teen-agers. Discussion groups then worked on the topic of using the attitudes and habits of teen-agers to promote well-being through nutrition.

As a result of this conference, the Vermont Dietetic Association decided to conduct a nutrition project competition which was open to students in grades seven through twelve, and to teen-age club and class groups. A prize of $25 was offered for the best project carried out and reported to the contest committee by April 1.

Career Guidance in the States

By FRANCES W. MARGUT
A.D.A. Career Guidance Chairman

Kansas has provided the perfect keynote statement for this issue. To quote from "Notes from the President" of that state association—"Did you see the specially headed column in the JOURNAL for career guidance activities? Send your report of special events to Sybil Banks (Kansas Career Guidance Chairman), so that Kansas can receive publicity for your well-earned efforts." We hope all other Associations are expressing

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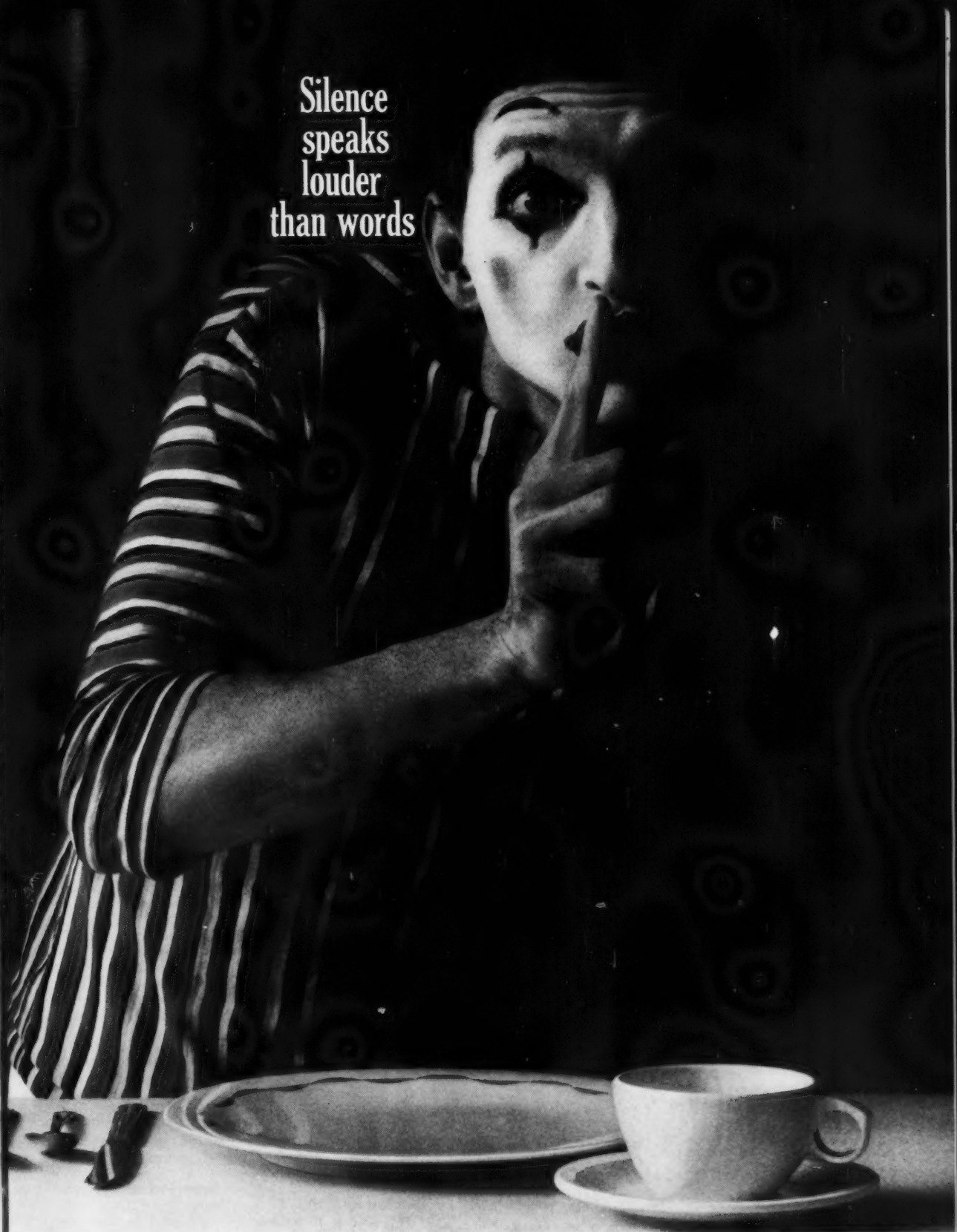

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equal interest and being similarly instructed!

Alaska has arranged monthly television presentations—August 1960 through June 1961—over Station KTVA, Anchorage. The time is utilized not only for career guidance, but also to promote good nutrition, community relationships, and professional understanding. Programs particularly geared to career guidance have been:

November—Elaine Bard, President, Alaska Dietetic Association, with the help of the President of the Anchorage City Dietetic Association, discussed public relations–career guidance goals and activities and explained functions of the city-state dietetic associations.

December—Joan Harrison and Christine Gill, Therapeutic Dietitians, Alaska Native Hospital, Anchorage, spoke on "Hospital Dietitians' Share in Patient Care," and presented a detailed description of their duties.

January—The Public Relations-Career Guidance Co-Chairman spoke on "Dietetics as a Career." She stressed the urgent need for qualified dietitians and the wide choice of careers within this professional field.

California. Early in the fall, the *San Diego Region* discussed a group follow-up of names provided by referrals from A.D.A. and registrants at the Dietetic Booth of the city-wide Careers in Health Conference held last spring. It was proposed that a committee be appointed to invite these girls to spend an afternoon seeing "Dietitians in Action." Thirty-five letters were sent out, 19 replies were received, and 12 girls actually attended. At 1 p.m. on a Saturday afternoon, all met at a central location. Light refreshments were served, and the purpose of the tour was explained. As the girls were being driven to the various places to be visited, they were briefed on the particular field of dietetics they were about to see. At the end of the afternoon, all returned to the starting location, where there was the opportunity for questions and answers.

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Delaware. This association is cooperating, not competing, with the Delaware League of Nursing, with the result that the League has requested a display of dietetic materials and a representative to explain the opportunities for varied careers in our profession in a joint program for students of the P. S. DuPont School, Wilmington.

Hawaii Dietetic Association is a participating member of a wonderfully well balanced joint Career Guidance Committee. In addition to a dietitian, other members include a nutritionist, a professor from the Home Economics Department of the University, the Director of the Honolulu Home Economics Education and School Lunch Program, the Career Guidance Chairman of the Hawaii Home Economics Association, a member of the University of Hawaii Extension Service, and a representative of the Home Service Department of the public utility company. The film strip, "Take a Good Look," was shown to this group, and the members were very impressed with its content, the color, and illustrations. The Committee has decided to concentrate on educating counselors and principals of the Honolulu schools and the general public as to the educational requirements of and job opportunities for varied careers in home economics.

Indiana. *The Northern Indiana Dietetic Association* conducted an interesting experiment in conjunction with showing "View from the Mountain" and "Take a Good Look" to three eighth grade classes.

To the first and third groups of girls, the film strip was shown after the movie. Girls at this age are romantically inclined and so liked the "View" film better. They thought the film strip "boring"—and were amused by the beep on the record. The second group saw "Take a Good Look" before "View." They responded much more to the former, asked many questions and found it interesting.

Thus the suggestion to others showing both film and film strip is to show

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the film strip first for best results. The Hoosier dietitians would be interested in knowing what others may experience in this situation.

Missouri. In March, the *Columbia Dietetic Association* cooperated with the Home Economics Editor of the Agriculture Editor's Office, University of Missouri, on a program over KOMU, the University-operated television station. This was an interview, supplemented with slides from "Career Choices in Dietetics," charts, and graphs. The program was tied in with Home Economics Week and the dedication of a new home economics building at the University. A series of taped spot announcements were sent in advance to fourteen radio stations as well as news releases to the press throughout the state, so that the program attracted a large audience.

Nebraska. "Take a Good Look" was shown to 100 freshmen at the University of Nebraska by Josephine Brooks, Ph.D., Head of the Food and Nutrition Department. It was felt the film strip answered many questions effectively and clearly.

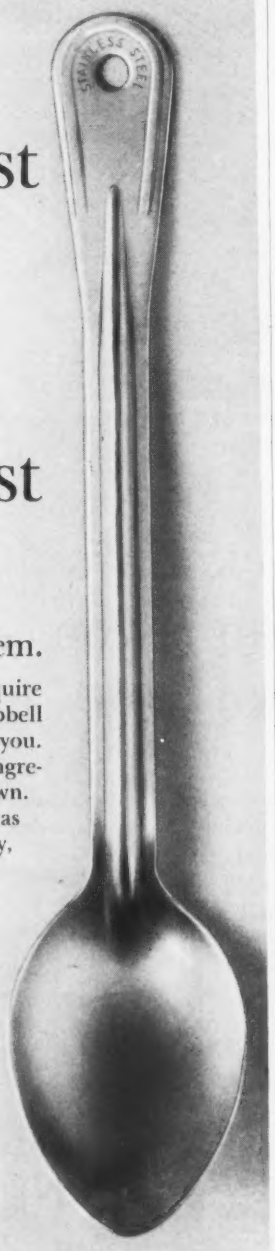
Fifty-one girls at the University of Nebraska indicated dietetics as their choice during "Career Days" at the Agriculture College. Since they attended by choice and because of personal interest, the reaction was excellent. One girl is following up to the extent of going to summer school to pick up courses she will need for a major in foods and nutrition.

Wisconsin. The Public Relations-Career Guidance Committee is working with the Editor of the woman's page of the Milwaukee *Journal* on a series of articles on careers in dietetics. The dietetic interns at Milwaukee County Hospital have been featured (a half-page article and a half-page of pictures). These interns also appear at intervals with Breta Griem on her television program, "What's New in the Kitchen," aired over WTMJ-TV, Milwaukee. Therapeutic diets form the topics for interesting and informative demonstrations.

The Wisconsin Association contributed $200 to the Action Committee of the Wisconsin Home Economics Association for coordinating recruiting and educational activities. Meetings and workshops of this committee are well attended by dietitians. The Wisconsin Dietetic Association will likewise provide three booklets on dietetics to be included in each kit for distribution by the Action Committeee.

A brochure entitled "Dietetics Is for You"—and employing this phrase as a caption for each job opportunity described—is being prepared by the Public Relations Committee for distribution by the Career Guidance Committee.

Can the most versatile soups for quantity food service also be the most economical?



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Public Relations in the States

By HELEN G. INGERSON
A.D.A. Public Relations Chairman

Ohio. Members of the *Dayton Dietetic Association* have found a solution to the problem of a permanent mailing address to put on pamphlets and press and radio announcements. They keep a post office box in the name of the association. An average of four letters a month are received requesting career or nutrition information.

The *Mahoning Valley Dietetic Association's* Annual Food Fair, held in December, was a joint public relations-career guidance activity. More than a hundred attended, including sixty high school students interested in dietetics and their teacher-sponsors. A smorgasbord was prepared by dietitians who served their favorite dishes, and a small booklet of the recipes was given to each guest. The film, "View from the Mountain," was shown and two dietetic interns from St. Luke's Hospital, Cleveland, told of their experiences as students and interns. . . . The dietitians of the Mahoning Valley Dietetic Association have prepared slides captioned, "Dietetians at Work and Play." They are used throughout the state in exhibits at various meetings. They were also shown at a Christmas meeting at the St. Joseph's Hospital in Warren. Senior high school girls and their teachers, dietary super-

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visors, and members of the Hospital Service League were special guests.

The Public Relations Committee of the *Toledo Dietetic Association* sent a letter to the "Dear Mary's Reader" column of the local paper, offering services to those who may need advice on dietary problems.

Association Activities

A.D.A. Future Conventions. The following is the schedule for Annual Meetings of The American Dietetic Association through 1963:

1961—44th Annual Meeting, St. Louis, October 24-27
1962—45th Annual Meeting, Miami Beach, October 9-12
1963—46th Annual Meeting, Philadelphia, October 15-18

Our Representatives Report. Nelda Ross Larsson reports some of the highlights from the *National Health Council Forum* on "Better Communication for Better Health." held in New York City, March 14 to 16:

Recent research in communication in the health field and motivational research in health communication were discussed. One cause of faulty communication relates to divergent ideas of health care and the criteria evaluating it. It is effective to know what factors the community or individuals consider important and how the group is rated on those factors. A factor analysis in the community is helpful in learning the language of the community.

Another barrier in communicating with the public is cultural diversity. The practice of training members of the group (to which one wishes to communicate) as "health visitors" has been successful and is being studied in other situations.

Public health services may also find a need to recognize certain group conceptions of health and illness in order to communicate effectively and to establish the personal relationship required for continuity of treatment. There may be a need for a new occupational person between the doctor and patient. To overcome barriers in communication with the public, discussion groups and opinion leaders are more effective than mass media alone, if the material is complex and not close to accepted values.

To change behavior requires more than communication; many studies have shown that attitudes cannot be changed by presenting facts alone. Motivational research must follow research in communication.

* * *

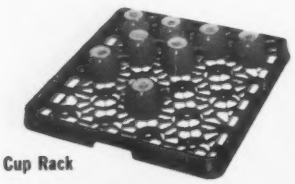
Elizabeth M. Lund, New York State Department of Health, reports on the annual meeting of the *National Advisory Committee on Local Health Departments* on March 13 in New York City:

Improvement in community health services will come only through better planning. One approach to planning is that of "Community Fact Finding." This was the theme of the meeting.

The National Advisory Committee is interested in and concerned with better community health services, since one of its objectives is to promote, with citizen participation, closer working relationships between voluntary and official agencies at local levels. In this behalf then, Peter Rossi, Ph.D., Executive Director, National Opinion Research Center, Chicago, talked on "What Makes Communities Tick?" and Robert Morris, D.S.W., Associate Professor of Community Planning, Brandeis University, discussed "Demographic Changes and Their Effect on Community Fact Finding."

To demonstrate the kind of studies committees might undertake for community health, two representatives from such projects elaborated on the plans, problems, and outcomes of their studies. The "Guide to a Community Health Study," published by the American Public Health Association was used in one of these projects.

A.D.A. Representatives. Anna M. Tracy, University Residence Halls, Columbia University, represented the Association at the inauguration of Dr. John Rutherford Everett as Chancel-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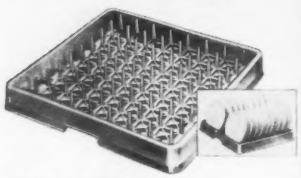
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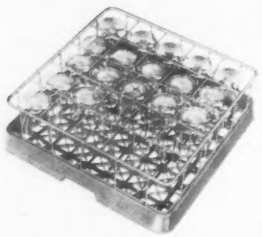
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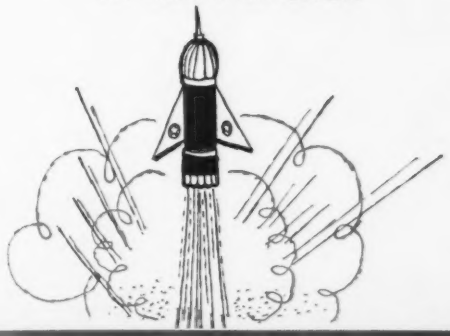

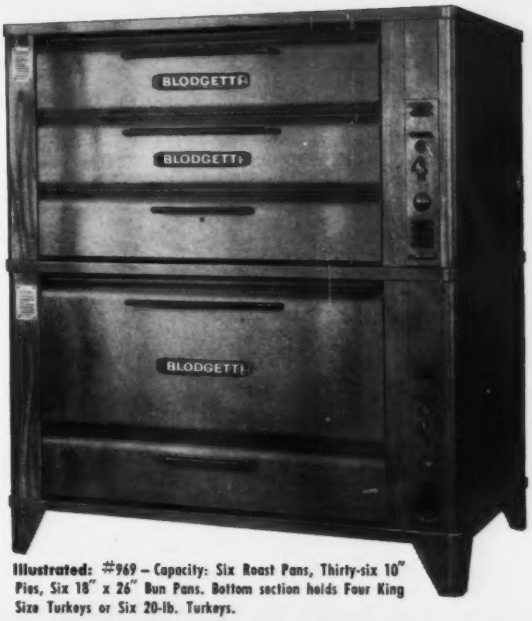

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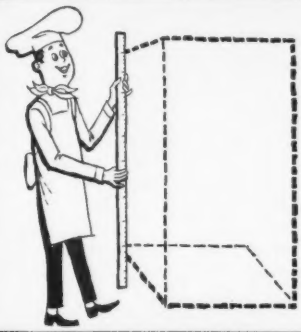

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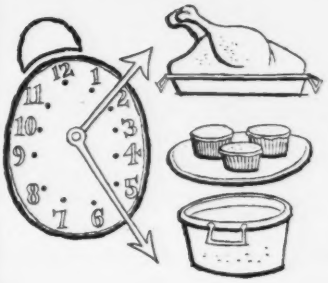

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lor of the *Municipal College System, City of New York,* on April 24.

Byrdine H. Tuthill, University of Missouri Hospital, attended the dedication of the new wing of Stanley Hall of the School of Home Economics, *University of Missouri,* on March 24.

Frances Janda, Santa Rosa (California) Memorial Hospital, represented A.D.A. at a meeting of Region 7, *Women's Civil Defense Council,* March 20 and 21.

A.D.A. Management Seminar. The University Extension Business Administration, University of California at Berkeley, is cooperating with The American Dietetic Association in the planning of a management seminar to be held July 30 to August 5. This program will be the third in this area to be sponsored by A.D.A., the previous ones having been presented last summer at the Universities of Pittsburgh and Illinois. The seminar is planned to help the participants become better managers in their present positions and to assist them in preparing for greater responsibility.

Further details may be obtained from the Seminar Department, The American Dietetic Association, 620 North Michigan Avenue, Chicago 11, Illinois.

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CREAMY RICE TASTE

What's more, Cream of Rice is as delicious as it is nutritious. That's why it's so good as a breakfast cereal, too! Adults and children alike will enjoy its creamy deliciousness.

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Obituary

Laura W. Drummond. The A.D.A. office has been notified of the death of Laura W. Drummond, Ph.D., in New York City on February 3, 1961. Dr. Drummond, who had been a member of the Association for more than thirty years, had held positions as Director of Home Economics at Temple University, Philadelphia, Pennsylvania State College, and Teachers College, Columbia University.

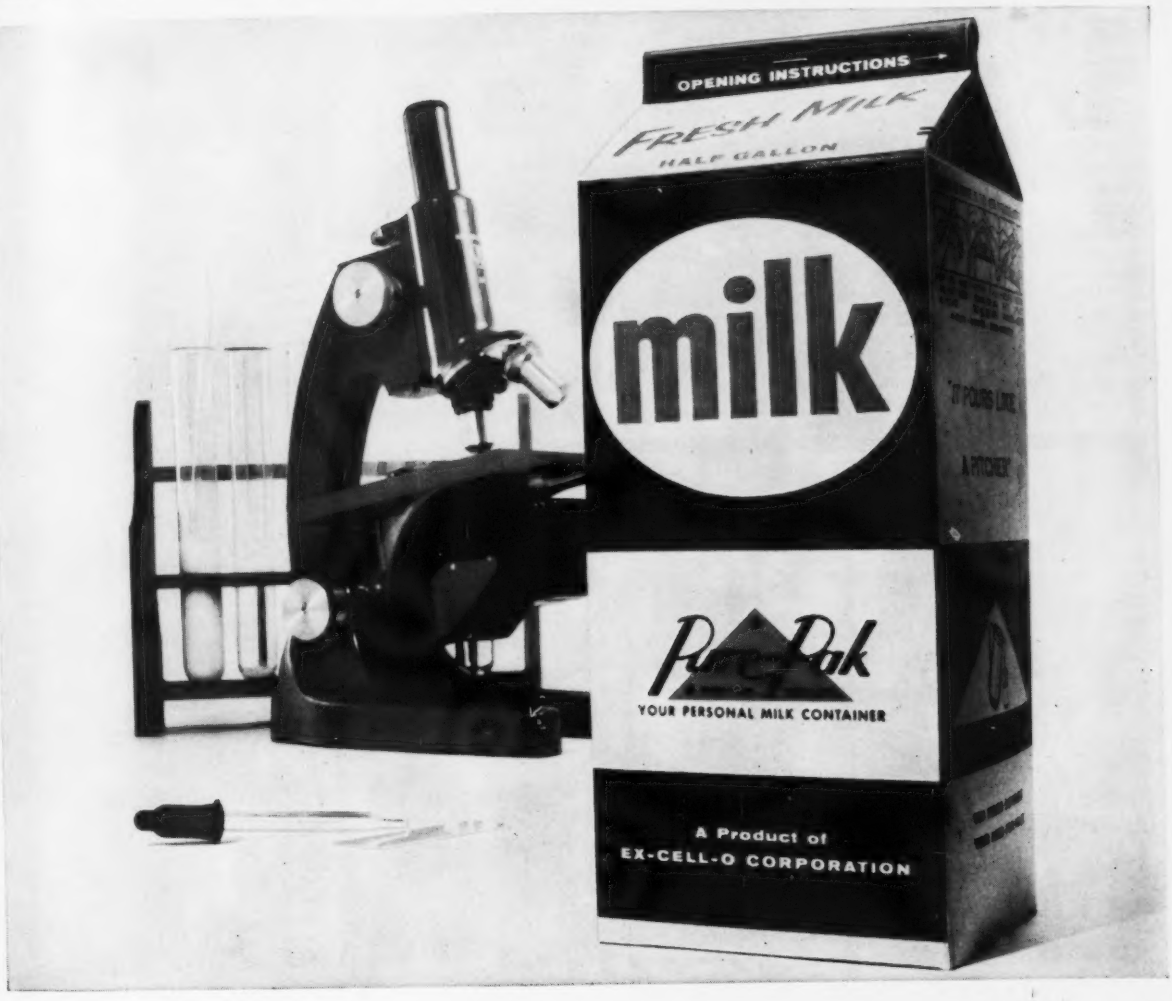
News of Products and Services

A new commercial oven developed by the *American Gas Association* circulates heated air through the oven up to seven times as fast as in a conventional oven, cutting baking time nearly in half. Gas-heated air is forced through the stove by a blower; the rapid movement of the heat penetrates the "air film" surrounding the food and high-speed baking is achieved by the swiftly moving air, not through an appreciable rise in temperature. Research is going forward to determine how the principles developed can be extended to the home kitchen. Designed mainly for baking, the oven has proved successful in the preparation of precooked, frozen foods. A full report on "High Speed Oven Design and Baking Studies, Part II: The Celeriter Oven," is available.

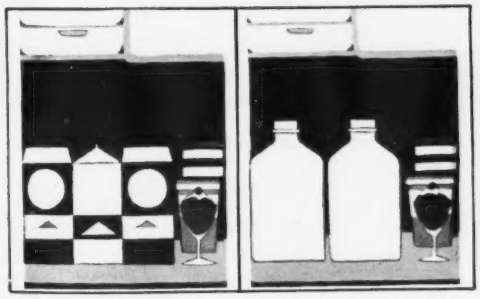
A new 20-qt. steam-jacketed kettle with a mixing mechanism has been introduced by *Groen Mfg. Co.* Designed for use where controlled temperatures and continuous mixing are required to prevent scorching or sticking, the unit has twin agitators powered by a two-speed, ½-h.p. motor that mix and scrape the sides of the kettle. Cream sauces, icings, gravies, and custards can be prepared without hand stirring. Large batches of frozen vegetables, cereals, scrambled eggs, and instant food products may also be prepared.

Three new cake mixes have been adapted from *Pillsbury* Bake-Off Recipes: Chocolate Nut, Date Nut, and Banana Nut. All contain chopped nuts. To prepare, just add 1 egg, water, and beat for 2 min. The cakes stay moist for days—keep well in the baking pan, too; may be served warm or cold, with or without frosting. Packaged in one-layer size, the batter will fill 8- or 9-in. round and 8-in. square cake pans.

A special feature of the National Restaurant Association show this year will be a "Kitchen Modernization Clinic" to be conducted by Arthur W. Dana and sponsored jointly by: *Lowerator Division, American Machine & Foundry Co.; B. H. Hubbert & Son; Cleveland Range Co.; Crescent Metal Products, Inc., Dubois Chemicals, Inc.; G. S. Blakesley & Co.; Keating of*



MOST SANITARY *way known to package milk...Pure-Pak!*



Pure-Pak cartons save 30% on valuable refrigerator space and eliminate wasted storage space needed for empty bottles.

Did you know that each Pure-Pak carton is formed and sterilized inside and out mere seconds before being filled? It's used only once, only for dairy products. And Pure-Pak has the exclusive gable top that protects the built-in pouring spout from dirt, water and other impurities. It pours like a pitcher . . . no drip, no dribble, no mess.

Cafeteria lines move quickly and smoothly when the handy half-pint size is used.

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28 million times a day, in 30 countries, someone breaks the seal on a fresh Pure-Pak carton

Chicago, Inc.; Metropolitan Wire Goods Corp.; Paul F. Kraft, Inc; Qualheim, Inc.; South Bend Range Corp., and *Victory Metal Manufacturing Corp.* This feature display will be presented in one of the special "theme centers" of the show. The presentations at the clinic will be geared first to education, and second to getting the most out of your purchasing dollar when buying kitchen equipment. The versatility of various kitchen equipment items will be demonstrated and new products and developments in existing products that are engineered to create greater efficiency will be shown. The visitor entering the Kitchen Modernization Clinic will see four work centers developed with the operator in mind, all of which will be typical of a commercial kitchen. These will include: receiving and storage, preliminary food preparation, cooking and baking, and dishwashing, scrapping, and disposal. In each center, the visitor will see equipment supplied by the participating companies in actual use, with demonstrations emphasizing how the buyer can get the most for his money. Mr. Dana has prepared an analysis of each piece of equipment displayed which will be presented on display signs.

Winner of the 1961 *Pillsbury* Award, an on-the-job training fellowship is Judith K. Coleman, a senior at Oregon State College, Corvallis. Beginning July 1, Miss Coleman will become Associate Director of the Pillsbury Junior Home Service Center. In addition, she will receive an award of $100. At the end of a year as Associate Director, she will be offered either another job with Pillsbury or a $2500 fellowship for a year's graduate study in home economics. The six Pillsbury Honor Award winners for 1961, each of whom has received $250, are: Prudence B. Brown, University of Connecticut; Patricia A. Anderle, University of Illinois; Judith A. Herron, Pennsylvania State University; Marianne M. Soponis, Drexel Institute of Technology; Mary E. Kendall, University of Alabama; and Nerita D. Smith, Otterbein College, Westerville, Ohio.

Market Forge Company announces a "One-Stop Nourishment and Ice Station" for hospitals. Measuring 72 in. wide by 80 in. high and 28 in. deep, the unit contains an automatic ice-maker and dispenser, a 6½-cu. ft. refrigerator, and a work counter conveniently running the entire length of the unit. The outstanding feature is the ice-maker. Large ice granules are made at the rate of 350 lb. per day and dispensed into a stainless steel container in a sealed, insulated compartment holding up to 60 lb. By operating a lever, the ice is dispensed into the patient's container, eliminating possible human contamination. The refrigerator is equipped with temperature control, sliding doors, two shelves for storage of fruit juices, milk, gelatin, and other foods. Several drawers at the lower part of the unit are provided for the storage of bread, silver, utensils, pots and pans, supplies, and so on. Also provided are: two easy-to-reach cabinets for other storage needs; a removable waste container with a cut-out above the door for disposal; and soap, cup, and towel dispensers. The work counter includes a sink, equipped with hot and cold water connected to a swing spout, two built-in hot plates, one controlled by a five-position rotary switch and the other with automatic temperature control, both with pilot lights. One connection is required for each service—water, drain, and electricity. This "floor pantry" is made of stainless steel.

How to make a good cup of coffee is the subject of three teaching aids available from the *Pan-American Coffee Bureau*. "Coffee, Please!"—a twenty-four-page illustrated reference booklet—outlines steps to follow in making coffee by percolator, drip, and vacuum methods and in caring for the coffee-maker. Recipes are also included. A four-page leaflet, "A Good Cup of Coffee," is a handy guide to good coffee-making, and a 20 by 30 in. wall chart, "How to Brew a Good Cup of Coffee," points out the steps to follow and rules to remember in brewing coffee.

A new line of compact counter

History of The American Dietetic Association

1917-1959

Mary I. Barber, Editor

This is the first official history of the ADA from its inception in 1917 through 1959. More than being merely a record of the Association, its origin, structure, aims and accomplishments, this new book includes the many personalities that represent its leadership and explores the role of the dietitian from ancient times to the Space Age.

Chapter 1 considers the term "dietitian" historically, and presents a definition which describes the dietitian's responsibilities today. Chapter 2 outlines the history of dietetics from the ancient Ebers papyrus to the present, highlighting the achievements of great figures in the history of nutrition.

Chapter 3 gives an interesting account of the founding of the ADA. Chapters 4 through 7 record by decades the spectacular advances both of the ADA and of the science in general. Chapters 8 through 14 describe the structure of the Association, and the work of the various Committees and Sections devoted to education, community nutrition, diet therapy, etc.

Chapters 15 through 19 cover the history of dietitians in military and government service, the United States Children's Bureau and the role of the Journal of the ADA and the Association's Public Relations Department. Chapter 20 relates the challenging aspects of dietetics in the Space Age.

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St. Mary's Hospital, Kansas City, Mo., replaced two 18-inch fryers with two 14-inch Keating Gas Fryers in a 1,500 meal-a-day operation. The smaller, high-speed Keatings – holding 38 lbs. of fat each, compared to 68 lbs. in the previous type – now do the same work faster and better with 45% less fat.

These Keating Fryers will soon pay for themselves in fat savings and with the unbeatable fuel economy of gas. Moreover, they turn out tastier, more digestible foods with the precise control of gas heat. No excess fat seeps in to make food soggy. This is *controlled fat absorption* – load after load, day after day.

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American Gas Association

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model Open Hearth Charco-Gas Broilers (Series 50), manufactured by *Bakers Pride Oven Co., Inc.*, is designed to give meats the truest charcobroiled flavor, aroma, and appearance, without the use of charcoal. A minimum metal-to-meat contact is provided in the specially designed "Grease-Flo Grate." The meat rests on the peaks of the wavy patterned surface, thus eliminating frying or grilling. Other features are: concealed internal grease drain system; burners utilizing all types of gas; new multi-level broiling rack for toasting buns, braising, and pan-broiling seafoods; permanent Glo-Brick in the bed of the broiler. For two- and three-grate sizes, a griddle plate may replace or be placed over the grate for frying breakfast specials. Counter and floor models are manufactured in one- to three-grate sizes and are available with stainless steel front and top, Hammertone sides, or stainless steel all around.

New Instant Mashed Potatoes from *General Mills* have better flavor and texture and require no milk. To 1¾ c. boiling water, 1 tbsp. butter, and ½ tsp. salt gradually add one envelope of potatoes and whip with fork until fluffy. One 7-oz., retail package yields eight servings.

Adolph's Ltd., now offers an "Instant Meat Tenderizer" which is said to make "cooler aging" unnecessary. The surface of the meat is prepared, one side at a time by thoroughly moistening the meat with water and sprinkling the tenderizer evenly as with salt. Use about 4 oz. for 50 lb. meat. Pierce the meat at ½-in. intervals to insure penetration and retention of juices. Cooking time and shinkage are reduced 25 per cent, it is claimed. Less-tender braising cuts may be roasted or broiled. *Adolph's* Instant Meat Tenderizer is available for institutional use in 16-oz., convenient shaker-top jars in two forms: unseasoned, without spices, and seasoned, with a chef's blend of spices; both contain salt.

Haveg Industries, Inc., has announced plans to manufacture a new line of wide temperature range plastic disposable dishes and cookware known as HAV-A-TRAYS. Suitable for frozen food packaging, catering services, hot food vending machines, and for heating, cooking, and serving foods, the containers may also be used in microwave cooking units. Designed as a throw-away item, the trays are, nevertheless, re-usable and have withstood dishwashing cycles without damage. Printed messages, trademarks, and other designs may be molded into the containers. In addition, trays can be molded in color for use in color coding and matching decor.

Newest in the *Campbell Soup's* line of Swanson TV dinners is the frozen Loin of Pork Dinner with slices of pork loin in gravy, spiced apples, and French-fried potatoes. Thirty min. in a very hot oven, 450°F., and the dinner is ready to serve.

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"Worth their Weight in GOLD"

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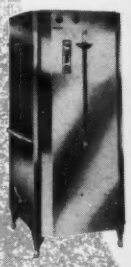
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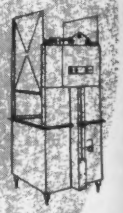
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